KEY FACTORS ASSOCIATED WITH ACQUIRING ADVANCED LANGUAGE PROFICIENCY: HERITAGE AND NATIVE SPEAKERS

By
Annie Rivera 정애니

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Abstract

The United States lacks a workforce with multilingual skills at advanced levels of proficiency to meet national security, defense, intelligence, diplomatic, and economic needs (Pufahl & Rhodes, 2011; U.S. Department of Education, 2008). Many students in the U.S. can gain up to intermediate proficiency levels of a world language through the American K-12 pipeline (Malone, Rifkin, Christian, & Johnson, 2003; O'Rourke, Zhou, & Rottman, 2016). However, native and heritage speakers have an advantage in reaching advanced proficiency levels due to their prior language experiences (Brecht & Ingold, 2002; Jia & Aaronson, 2003; Montrul, 2005; Parameshwaran, 2014). This quantitative study of adolescent heritage and native language speakers examined the correlation between key contextual and advanced proficiency levels. The researcher used existing data from proficiency tests and responses to a questionnaire called the Bilingual Experience Language Calculator (BiLEC) (Unsworth, 2016). The BiLEC provided rich data regarding the contextual factors (quantity and quality) of the students' language acquisition background and current language maintenance. Using Spearman's rank order correlations, the researcher determined weak positive associations between literal, oral, and composite proficiency measures and quantities of target language exposure. In a filtered sample of advanced proficiency scores, the correlational study yielded non-statistically significant results between the amount of cumulative language exposure and proficiency scores. The lack of statistically significant evidence implies that language proficiency does not necessarily increase as the amount of target language exposure increases. Rather than viewing target language exposure and other key factors in isolation, the researcher concluded that a holistic view provides a visual framework of the complex factors that comprise language acquisition. As such, the researcher developed the "Extralinguistic Factor Grid" to facilitate the observation, reflection,

and intentional decisions that affect language maintenance and growth toward advanced proficiency levels.

Keywords: world languages, extralinguistic factors, advanced, language maintenance, heritage, native

Adviser: Dr. Chadia Abras

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Student's Name: Annie Rivera Date: December 17, 2020

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The student has made all necessary revisions, and we have read, and approve this dissertation for submission to the Johns Hopkins Sheridan Libraries as partial fulfillment of the requirements for the Doctor of Education degree.

Chadia Abras	chadia abras	12- 17-20
Adviser	Signature	Date
Christine Eith		12-17-20
Committee Member	Signature	Date
Duarte Silva	Duarte M. Silva	12-17-20
Committee Member	Signature	Date

Dedication

This dissertation is dedicated to my grandmothers, parents, and daughter, who represent the past and future of my cultural and linguistic heritage:

To my grandmothers, Josephina Lee† and Mariana Sim, who immigrated to the States to help raise me and gift me with my first language and culture, Korean;

To my parents, Dr. Greg Yong Woong and Theresa Jeong, whose discipline and successes throughout their lives as immigrants and English Language Learners taught me how to persevere, set goals, and effectively achieve them;

And to my daughter, Camila Yuna Rivera, whose inspiring spirit and confidence in her identity at such a young age redeem every cultural struggle from my childhood.

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Executive Summary

This research study consolidates the need for world language skills in the American workforce to address national urgencies. In this quantitative study, the researcher used existing world language proficiency exam scores of heritage and native speakers in her school district. The researcher determined the exam score correlations with the quantity and quality of past and current language exposure.

Problem of Practice

The United States workforce lacks advanced multilingual capabilities to address national needs (Clifford & Fisher, 1990; Robinson-Stuart & Nocon, 1996; Tochon, 2009; United States Department of Education, 2008). According to the existing literature, several factors contribute to the problem. Language teacher shortages (Pufahl & Rhodes, 2011; Rosenbusch, 2005) and low enrollment in world language courses (American Councils for International Education, 2017; Pufahl & Rhodes, 2011) hinder the ability of the American K-12 pipeline to foster advanced language abilities in students. Several studies confirm low economic premiums for language skills (Fixman, 1990; Fry & Lowell, 2003; Gándara, 2014; Nguyen, 2015). Lack of contact hours with the target language also contributes to the problem (Carroll, 1967; Davidson 2007; Segalowitz et al., 2004). The quality of instruction (Swanson, 2008) and individual factors, such as age (Bylund, Abrahamsson, & Hyltenstam, 2012; Lenneberg, 1967 as cited in Singleton, 2003; Oyama, 1976; Seliger, 1978; White & Genesee, 1996) and motivation (Dörnyei, 1994; Oxford 1994) are also relevant factors of language acquisition.

This research study focuses on the target language contact hours as a key factor in the problem of practice. In particular, the language onset and amount of contact hours characterize world language speakers as native, heritage, or non-heritage (Aalberse & Nuysken, 2019; Brecht

& Ingold, 2002; Grin, 2019; Singleton & Pfenninger, 2019; Unsworth, 2013; Valdés, 2014). Heritage and native speakers possess a linguistic advantage to reach high proficiency levels because of their significant exposure to the target language (Brecht & Ingold, 2002; Jia & Aaronson, 2003; Montrul, 2005; Parameshwaran, 2014).

Theoretical Framework

A combination of theories frames this research study. Noam Chomsky's (1965) nativist theories challenged the behaviorist tradition, which reduced language ability to rote repetition and imitation through conditioning. Chomsky's Language Acquisition Device evidenced the innate capacity to mediate inputs and outputs to acquire a language. Thereafter, Jerome Bruner (1974) and Jean Piaget (1997) reflected the constructivist views, in which individuals actively construct meaning through peer interaction. Reinforcing such perspectives half a century prior to Bruner and Piaget, Lev Vygotsky (1978, 1986) emphasized the sociocultural strand of constructivism, in which social and cultural contexts shape knowledge. Vygotsky's sociocultural theory (1978), the main theoretical framework for this study, established social interaction as a factor in cognitive development. The construct of the zone of proximal development represents an individual's range of cognitive abilities with and without the assistance of a "more capable peer" (p. 86). Such dynamic highlights the development of language through interaction with others or through language inputs. Stephen Krashen's (1982) Input Hypothesis popularized the role of language input in second language acquisition. In combination, these theories posit that language acquisition results from an active social construction of knowledge and is influenced by setting and culture.

Synthesis of Relevant Literature

The existing literature lacks an established repertoire of studies highlighting the critical factors leading to the Advanced proficiency level, as defined by the American Council on the Teaching of Foreign Languages Proficiency Guidelines (2012). Such factors include quantity, quality, and contexts or type of target language exposure.

Quantity of Language Exposure

Language exposure refers to the quantity and type of contact hours with the target language (Carroll, 1967; Malone, Rifkin, Christian, & Johnson, 2003; Unsworth, 2013). The history of language exposure between heritage speakers and native speakers differs (Montrul, 2008). The native speaker has a later age of onset (AO) of the majority language (i.e., English in the U.S.) than the heritage speaker. Whereas the native speaker has an AO of the second language (L2) greater or equal to 12 years of age, the heritage speaker AO is less than 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian, Flege, & Liu, 2000). In the case of heritage and native speakers, the first language (L1) maintenance is subject to the dominance of the majority language (Benmamoun, Montrul, & Polinsky 2013; DeKeyser, 2000; Montrul, 2008). Studies in the literature operationalize the target language exposure as the difference between the individual's present age and the AO (Abrahamsson & Hyltenstam, 2009; Unsworth, 2016). Although the literature suggests that higher quantities of language exposure lead to higher proficiency levels (Carroll, 1967; Davidson, 2007; Larson-Hall, 2008; Rifkin, 2005; Segalowitz et al., 2004; Shedivy, 2004), quantity alone does not determine proficiency outcomes (Birdsong, 1999; Benmamoun et al., 2013).

Contexts of Language Learning and Implications for Proficiency

The settings of language learning bear noteworthy significance for language proficiency (Unsworth, 2016). The contexts of home, formal school, and study abroad represent three common environments for language acquisition. Individuals who acquire language from their homes are categorized as heritage or native speakers (Benmamoun et al., 2013; Valdés, 2001). Heritage speakers may or may not have had formal schooling in their home language, depending on the AO of the L2 (Benmamoun et al., 2013). Native speakers attend formal school in the home language since their AO of L2 is ≥ 12 years old. Formal schooling for language learning varies. Immersion or dual language programs, specialized heritage learner courses, traditional world language courses and community-based heritage language classes are examples of formal schooling (Brecht & Ingold, 2002; Pufahl & Rhodes, 2011). Each language education model differs in the number of contact hours and language use (Pufahl & Rhodes, 2011). Empirical studies determine that immersion classrooms yield higher proficiency levels than a traditional classroom setting (Rifkin, 2005; Xu, Padilla, & Silva, 2015). The study abroad setting provides an authentic cultural environment for acquiring a language (Mitchell, Myles, & Marsden, 2013). Such immersive contexts boast positive effects on proficiency levels (Carroll, 1967; Davidson, 2007; Hernández, 2010; Jochum, 2014; Segalowitz et al., 2004).

Research Purpose and Objective

The purpose of this research study is to examine the quantity, quality, and contexts of world language exposure with proficiency levels for heritage (H) and native (N) speaker types. Through a quantitative study, the researcher determines language exposure and use in different contexts, as well as the correlation of those descriptions to proficiency levels. The descriptive and correlational analyses further the understanding of factors associated with high language

levels. The goal is to ascertain the quantity and quality of language exposure to provide pathways to advanced proficiency.

Research Questions

The following research questions (RQ) guide this study:

1. What is the average amount of target language exposure within different contexts (home, school, or abroad in the target language environment) of students who are speakers of a LOTE?
2. What is the correlation between target language exposure and proficiency levels of students who speak a LOTE?
3. What is the cumulative (past and current) amount and average quality of language exposure of H and N speakers who have advanced language proficiency skills in LOTE?
4. What is the relationship between the cumulative amount (past and current) of target language exposure and advanced proficiency levels of H and N speakers of LOTE?

Research Design

This research study employs descriptive and correlational analyses. The researcher used existing data of middle and high school level student proficiency exam (STAMP 4S or WorldSpeak test) scores, the students' language background information from the proficiency exam, and results from the Bilingual Language Experience Calculator (BiLEC) questionnaire (Unsworth, 2016). The language background information determined which individuals are heritage or native speakers.

The first two RQs include data from all proficiency exam scores and corresponding language background information. In RQ #1, the average amount of target language exposure for

the contexts of home, school, and abroad comes from the language background information. In RQ #2, the oral (sum of listening and speaking scores), literal (sum of reading and writing scores), and composite (sum of oral and literal proficiency scores) proficiency are calculated using the exam data. The researcher used a Spearman's rank order correlation to determine the association between target language exposure and proficiency scores.

The second two RQs filter the sample to those who scored at advanced levels (score of 6 or above) on one or more sections of the proficiency exam. For RQ #3, the cumulative amount of language exposure (CLE) is derived from the BiLEC and calculated as the number of years, representing the accumulated time over a child's lifetime of target language exposure in home, academic, and social settings. The average quality of language exposure is represented on a scale of 0 to 5. For RQ #4, the researcher used a Spearman's rank order correlation to determine the association between cumulative amount of language exposure and average quality of language exposure with proficiency scores.

Findings

The results for the Spearman correlation between target language exposure amounts and all proficiency scores show a weak positive correlation between the two variables. The results for the Spearman correlation between CLE and advanced proficiency scores were not statistically significant. In addition, the results for the correlation between target language quality and settings were also not statistically significant.

To fully understand the extralinguistic or contextual factors of the advanced speakers in RQ #4, the researcher created a visual representation, Extralinguistic Factor Grid (EFG), of each student's profile sorted as H or N speakers. The EFG includes four major areas of interest relevant to the individual's contextual factors: 1) quality and quantity of language models at

home and surrounding environment, 2) quality and quantity of language models at school, 3) current quantity and quality of language models, and 4) current quantity of language exposure in different settings of the individual. The EFG for N advanced speakers reveals that three out of the four N speakers average over 56 waking hours per week of target language exposure and use. The EFG for H advanced speakers reveals that they all have home language models with "native fluency". Another trend is that most H advanced speakers accumulate 50 or more waking hours of target language exposure during the week.

Chapter 1: Literature Review of the Problem of Practice

Over the past decades, the United States has experienced growing interactions with international communities that require a multilingual skill set with the global community (Brecht & Rivers, 2000; Clifford & Fischer, 1990; Frey, 2002; United States Department of Defense, 2005a, 2005b, 2018; United States Department of Education, 2008). The research substantiates the need for advanced fluency in world language acquisition to improve employability, enhance business opportunities, and reduce conflicts associated with language barriers (Clifford & Fischer, 1990; Robinson-Stuart & Nocon, 1996; Tochon, 2009; U.S. Department of Defense, 2005a, 2005b, 2018), and strengthen national security and defense (Brecht & Rivers, 2000; Clifford & Fischer, 1990; U.S. Department of Defense, 2005a, 2005b, 2018; U.S. Department of Education, 2008). The U.S. Department of State and other federal agencies such as the National Security Agency (NSA) and the Office of Director of National Intelligence (ODNI), among others monitor the need to increase the number of speakers of the critical need languages, which are necessary for national security and prosperity. There is high demand, but low supply of individuals who are able to communicate at advanced levels in critical need languages (A National Security Crisis, 2012; U.S. Department of Education, 2008; U.S. Department of Defense, 2005a, 2005b, 2018).

Educational institutions can meet these communicative needs through robust opportunities for world language learning (Pufahl & Rhodes, 2011; Robinson, Rivers, & Brecht, 2006; Tochon, 2009). However, the literature validates that students in language instruction tracks in K-12 institutions in the United States have not acquired sufficient world (modern) language skills throughout their academic careers to communicate proficiently in an increasingly global economy (Brecht & Rivers, 2000; Pufahl & Rhodes, 2011; Robinson et al., 2006;

Robinson-Stuart & Nocon, 1996; Tochon, 2009; United States Department of Education, 2008). Students in the United States are able to gain up to intermediate level proficiency in a world language through the K-12 pipeline (Malone, Rifkin, Christian, & Johnson, 2003; O'Rourke, Zhou, & Rottman, 2016). Although intermediate levels of proficiency are attainable in school, there is an urgent call for advanced level speakers who are able to sustain lifelong proficiency to meet national language needs in a range of professions (Alarcón, 2010; Carroll, 1967; Moeller, 2013; Pearson, Fonseca-Greber, & Foell, 2006; Pufahl & Rhodes, 2011; U.S. Department of Defense, 2005a, 2005b, 2018; U.S. Department of Education, 2008).

Underlying Factors of the Problem of Practice

Throughout this dissertation study, the researcher uses the term "world language" as a culturally appropriate term that replaces "foreign language", which suggests English as the norm, thereby reducing the value of all other languages. The researcher recognizes that the umbrella of world language includes English. However, the use of "world language" in this dissertation study refers to all languages other than the majority language. This dissertation study examines language proficiency in the context of American needs and educational system where the majority language is English. Therefore, henceforth, the term "world language" refers to languages other than English (LOTE), unless otherwise noted. A review of the literature denotes several drivers that contribute to the problem of insufficient advanced level speakers of a world language in the U.S. Since language acquisition is a complex process with many facets, it is challenging to explicitly cite each factor related to such progression. The following categories attempt to highlight some of the key factors identified in the pertinent literature.

Lack of Societal Value for World Language Proficiency

Low enrollment in world language courses. One consideration is the lack of value for learning another language, as evidenced by the absence of courses, low student enrollment, and lack of articulation for a world language trajectory in the school system across the U.S. (American Councils for International Education, 2017; Larson & Hall, 2008; Nunan, 2003; Pufahl & Rhodes, 2011; Rifkin, 2005; Shedivy, 2004). In a study by Pufahl and Rhodes (2011), the authors use data from a questionnaire to examine all areas that impact world language programs within U.S. elementary and secondary schools, U.S. public and private elementary and secondary schools, yielding a 72% return. Pufahl and Rhodes (2011) indicate that both elementary and secondary schools have experienced decreases in world language offerings from 1997- 2008 due to lack of funding, shortage of language teachers, and the perception that world languages is not a core content area. The findings also demonstrate that teacher shortages exist and are more prevalent, particularly in rural schools with a lower socioeconomic status and the geographic region of the Pacific Northwest and Central States (Pufahl & Rhodes, 2011). This national study provides insight into how the lack of world language courses and teachers across elementary and secondary levels in the U.S. impact the opportunities that lead to world language proficiency of American high school students.

In another study, Rosenbusch (2005) examined the impact of the *No Child Left Behind* (NCLB) Act on foreign (as called in NCLB) language education in elementary and secondary schools. The author analyzed 2003 survey data from nearly 1000 public school principals from four different states and another survey conducted by the Northeast Conference on the Teaching of Foreign Languages (NECTFL), which includes 165 school districts. The findings reveal that the high focus on tested content areas reduces the instructional time dedicated to foreign

languages and other arts and humanities instruction and redirects spending time on the tested subject areas (as referenced in Rosenbusch, 2005). Another key finding of the study (Rosenbusch, 2005) is that the emphasis on spending time in the tested areas forced the reduction of world language teachers who taught at the high school level, as well as the elimination of one or more languages from course offerings. The reduction and/or elimination of language courses occurred as a result of redirecting time, staffing, and pecuniary resources toward the tested content areas per the NCLB Act (Rosenbusch, 2005). Although data collected from the *Council for Basic Education* are limited to only four states and the data from the NECTFL survey are primarily specific to only three states in the northeast, the study illustrates the unintended negative consequences on the maintenance and growth of world language courses and language and cultures courses available to students. The strong emphasis on other content areas aggravates the problem and reduces the chances for U.S. elementary and high school students to participate in world language learning opportunities during their academic careers.

In a comprehensive study of language course enrollments in the K-16 formal education school system in the U.S., only 11 states reported having world language graduation requirements (American Councils for International Education, 2017). Another study (Education Commission of the States, 2019) reports only seven states with world language graduation requirements that cannot be substituted with other courses. Furthermore, this study revealed that only 19.66% of the K-12 population in the U.S. enrolled in world language classes in the 2014-2015 school year (American Councils for International Education, 2017).

Low premiums for language skills. In addition to the low enrollments in the formal school system, earlier studies indicated traditionally low economic premiums for fluency in LOTE (Fixman, 1990; Fry & Lowell, 2003). Fixman (1990) claimed that U.S. based

corporations minimized LOTE skills of employees as a need. According to the study, Fixman (1990) stated that corporations tended to view LOTE skills as "mechanical" (p. 27) or addressable through an interpreter. Fry and Lowell (2003) examined the impact of bilingual skills on employee wages. The authors compared the wages of bilingual versus English monolingual workers, while controlling for characteristics such as race, education, age, and geographic area. Fry and Lowell (2003) concluded that the U.S. labor market does not favor LOTE skills through wages.

In a study of bilingualism and earnings in the U.S., Saiz and Zoido (2005) use data from the Baccalaureate and Beyond Longitudinal Study from the National Center for Education Statistics to focus on the labor market returns for college graduates who speak a language other than English. The results of the study indicate that although speaking a world language is rewarded in the labor market, the returns are relatively small (2% to 3%) compared to the returns of an extra year of general schooling (8% to 14%) (Saiz & Zoido, 2005). Saiz and Zoido (2005) also include a comprehensive set of control variables in the analysis to mitigate ability bias due to grades, standardized tests, parental education, academic majors and career preferences.

In contrast to Fry and Lowell (2003), who examined data from bilingual immigrants, Saiz and Zoido (2005) included responses from both native language majority (i.e., English) speakers who acquired a LOTE, as well as language minority speakers who acquired English. Another strength is that this study uses two datasets obtained in 1993 and 1997 related to language ability, which allows for data collection on world language abilities over time. Such a comparison also reveals whether or not individuals continue to maintain the target language in relationship to their monetary motivation to do so. This study provides insight into the individual decisions

made in weighing investments associated with world language acquisition against financial benefits.

More recent studies concur with previous findings regarding minimal labor returns for world language abilities. Nguyen (2015) particularly focused on college graduates who are native English speakers who acquired a second language through study. In direct comparison to Saiz and Zoido (2005) who found small increases in wages, Nguyen (2015) found that speaking a LOTE yielded no pecuniary benefits in the U.S. labor market for English-native college graduates who learned a second language. Porras, Ee, and Gándara (2014) surveyed 289 public and private sector employers of a different labor industries in California. Most employers (56%) reported the desire to hire bilingual candidates for some of their vacancies. However, the responses from those employers regarding higher compensation for bilingual skills indicated uncertainty (Porras et al., 2014). Almost half (44%) of the employers responded that their bilingual employees do not earn more for their language skills. However, through the interviews, the authors (Porras et al., 2014) learned that individuals in social service jobs did earn more money due to their bilingual abilities. Therefore, employers demonstrate preferences for bilingual individuals (Porras et al., 2014), but do not necessarily compensate them accordingly (Gándara, 2014). Such responses are noteworthy, given that the authors conducted the survey in California, home to the most LOTE speakers in the U.S. The results of this study also concur with previous findings regarding minimal labor market returns for world language abilities. It also informs problems associated with a lack of LOTE proficiency of high school students who have graduated from the American school system, in terms of student decisions to continue the trajectory of learning world languages over time (Porras et al., 2014).

Lack of Contact Hours

Even when language learning opportunities are in place, there are additional considerations. The lack of contact hours to learn a world language either inside or outside of the home is a factor (Carroll, 1967). This includes outside experiences that supplement language learning (Carroll, 1967; Davidson, 2007; Segalowitz et al., 2004), and generational transmission of the language in the case of heritage learners (Peyton, Renard, & McGinnis, 2001). These factors are further explored in detail later in this study in the context of learner types.

The Foreign Service Institute (FSI) of the U.S. Department of State (n.d.-b) notes that the average length of time for an English speaker to achieve "minimum professional proficiency" (level 3 on Interagency Language Roundtable Scale) depends on the similarity in linguistic features of the target language to English. The next section differentiates proficiency levels and scales. Although an individual's characteristics impact the time to reach such proficiency levels, FSI organizes the levels of language difficulty into four categories, which suggest a different amount of total class hours to acquire proficiency (see Table 1.1).

Table 1.1

FSI Language Learning Timelines

Category of difficulty	Number of weeks	Number of class hours
I	24-30	600-750
II	36	900
III	44	1100
IV	88	2200

Category I languages are similar to English, while Category IV languages are "exceptionally difficulty for native English speakers" (U.S. Department of State, n.d.-b). For example, Category I include Spanish, French, Portuguese, and Italian; Category II includes German and Swahili; Category III includes Farsi, Hebrew, Hindi, Russian, and Vietnamese; and Category IV includes Arabic, Japanese, Korean, and Mandarin (U.S. Department of State, n.d.-b).

As a point of comparison, high school students in the U.S. commonly receive 40 to 60 minutes per subject area for 180 to 200 days per school year (McLeod, Fisher, & Hoover, 2003). Using these statistics, high school students receive from 120 hours to 200 hours of world language instruction per year. Applying the FSI language learning timelines for Spanish, which is the most studied world language in the U.S., high school students need three to four years of continued study to reach minimum professional proficiency (Rhodes & Pufahl, 2014). Applying this logic, high school students would need a minimum of four and a half years for Category II languages, over five years for a Category III language, and 11 years for a Category IV language to reach minimum professional proficiency. Other sources such as the American Council on the Teaching of Foreign Languages (ACTFL) stress that the entry point for language learning should occur in elementary schools to reach advanced levels of proficiency (ACTFL, 2012c).

Quality of Instruction

The quality of instruction, including teacher language fluency and instructional efficacy, is also important in understanding the problem of practice (Allen, 2002; Cooper, 2004; The National Standards Collaborative Board, 2015). In a research study, Swanson (2008) determines the different factors associated with teacher efficacy and how self-perceptions of world language teacher efficacy affect teacher attrition. The author bases his research on social cognitive theory, emphasizing the notion of human agency and ability to monitor and regulate their own actions. Swanson (2008) cites previous research, linking higher self-efficacy to engage students in higher quality instruction that leads to improved communication skills in the target language. Swanson (2008) uses a large dataset of over 1000 world language teachers in the U.S. and Canada, who are mostly female and predominantly Caucasian. Approximately half of the

participants teach Spanish, followed by French and nine other world languages. Swanson (2008) uses two instruments, the Ohio State Teacher Efficacy and Self-Directed Search, to obtain data.

The findings of Swanson's (2008) study reveal that teachers lack confidence in the area of cultural knowledge associated with the target language, even if they felt confident with their reading and writing abilities. Challenges with classroom management also had a negative impact on teacher sense of efficacy. These findings provide administrators and legislators critical data on the factors that contribute to a low sense of teacher efficacy in world language instruction. Lower teacher efficacy leads to higher attrition rates in world language and ultimately impacts the volume of courses and programs offered for U.S. high school students to learn a LOTE.

Individual Factors

Finally, individual factors, such as cognitive, affective variables and age, also contribute to the problem (Bialystok & Miller, 1999; Carroll, 1967; DeKeyser, 2000; Dörnyei, 1994; Hakuta, Bialystok, & Wiley, 2003; MacIntyre, Baker, Clément & Donovan, 2002; Onwuegbuzie, Bailey & Daley, 2000; Tse, 2000). The age variable is explored further later in this study in the context of language learner types. The literature also suggests that individual learner factors, such as motivation and learning strategies influence the rate of personal language acquisition to some degree (Dörnyei, 1994; Gardner & Smythe, 1975; Horwitz, Horwitz & Cope, 1986; Oxford, 1994). Studies show that student attitudes differ with gender and age, especially during the adolescent years (MacIntyre et al., 2002). Therefore, student attitudes, which play a critical component in language learning, influence the world language proficiency levels of students in the U.S.

The factors related to the problem of societal views regarding world language proficiency in the United States are broad and would require complex and extensive interventions in order to affect even a small-scale cultural shift in values. When considering the main drivers mentioned above, the inadequate number of contact hours in the target language appears to be an overarching, key factor for the problem. Specifically, the amount of contact hours is further defined by the type and amount of target language exposure over time (Muñoz & Spada, 2019; Unsworth, 2013). To understand this concept further, it is important to recognize that there are various entry points to learning a world language, which categorize an individual learner type as a native, heritage, or non-heritage speaker (Aalberse & Muysken, 2019; Brecht & Ingold, 2002; Grin, 2019; Singleton & Pfenninger, 2019; Unsworth, 2013; Valdés, 2014). Each of these learner types varies in the amount of contact hours of the home or the target language. For example, native speakers have spoken the target language since childhood (Cook, 1999), whereas heritage speakers represent varying degrees of target language use (Montrul, 2012). A subsequent section further explains these learner type constructs. For the purpose of this study, the analysis of existing data focuses on the examination of key factors that influence the acquisition of linguistic proficiency levels of the following language learner types: native, heritage and non-heritage speaker.

Scales of Proficiency

Three widely referenced scales in the field of world languages in the United States provide measures of proficiency: Interagency Language Roundtable, ACTFL Proficiency Guidelines, and the Common European Framework of References for Languages (CEFR) (Lowe & Stansfield, 1988). However, common definitions of proficiency levels did not exist until the 1950s, when the Korean War necessitated world language expertise following the state of

unpreparedness of the United States dawning World War II (Herzog, 2003; Savignon, 1987; Sollenberger, 1978). In assembling manpower and resources, the idea of self-reporting of proficiency levels proved insufficient in the development of a world language skills registry (Herzog, 2003; Lowe, 1988; Sollenberger, 1978). As a response, the work of the Foreign Service Institute (FSI) of the U.S. Department of State along with government interagency collaboration led to the first definitions of levels, which formed the basis of current proficiency scales (Lowe & Stansfield, 1988).

Interagency Language Roundtable Scale

The Foreign Service Institute (FSI) devised the first proficiency scale (Lowe & Stansfield, 1988; Sollenberger, 1978), which consisted of six levels prefaced by the letter "L" (Sollenberger, 1978). The levels indicated overall language skills rather than separating abilities by language domains of listening, speaking, reading, and writing (Sollenberger, 1978). Level 1 or "L-1" meant "no proficiency in either reading or speaking a foreign language", while Level 4 indicated "sufficient proficiency in speaking a language to conduct ordinary routine business conversations and to read general non-technical material" (Sollenberger, 1978, p. 4). The government deemed Level 4 or "L-4" as the minimum competency to inventory the individual's language skills. Level 6 or "L-6" demonstrated "sufficient proficiency in speaking, reading, and writing to negotiate oral and written agreements and to thoroughly understand the press, popular and classical literature and official documents" (Sollenberger, 1978, p. 4). This scale proved insufficient for self-reporting of language skills.

After the Korean War, the need for diplomacy and international relations increased the value of communicative world language skills (Herzog, 2003; Savignon, 1987; Sollenberger, 1978). Refinement of the first proficiency scale split definitions of proficiency among six

speaking levels (L-1 to L-6) and reading (R-1 to R-5) accompanied by language testing to affirm those levels (Sollenberger, 1978). Thereafter, further development led to the separation of the language domains and a new nomenclature. A six-point scale numbered from 0 (no functional ability) to 5 (equivalent to an educated native speaker) served as the proficiency ranges in "S" for "speaking" and "R" for "reading" (Clark & Clifford, 1988; Herzog, 2003; Lowe, 1988). A checklist of factors, which included accent, grammar, vocabulary, fluency, and comprehension, accompanied the structured interview (Sollenberger, 1978). The checklist proved to reduce subjectivity of biased proficiency level reporting, and other government agencies adopted the system (Sollenberger, 1978).

The Interagency Language Roundtable (ILR), an organization consisting of federal agency representatives, continued the work begun through the FSI. The ILR led to the agreed descriptions of five skill levels of "S" (speaking) and "R" (reading) in 1968 (Sollenberger, 1978). The levels ranged from "no functional ability" (level 0), "elementary proficiency" (Level 1), "limited working proficiency" (Level 2), "minimum professional proficiency" (Level 3), "full professional proficiency" (Level 4), "native or bilingual proficiency" (Level 5) (Clark & Clifford, 1988; Liskin-Gasparro, 1984; Lowe, 1988; Sollenberger, 1978). The "+" symbol denotes ability beyond the absolute level, but not enough to fully reach the next level (Clark & Clifford, 1988; Liskin-Gasparro, 1984). Government agencies continue to use these descriptions to present day, while educational organizations typically favor the ACTFL Proficiency Guidelines.

ACTFL Proficiency Guidelines

The American Council on the Teaching of Foreign Languages (ACTFL) in conjunction with Educational Testing Services (ETS) developed provisional language proficiency guidelines

in 1982 based on the U.S. Government's Interagency Language Roundtable (ILR) Skill Level Descriptions (Liskin-Gasparro, 2003). The modifications included a new nomenclature which designated the ILR Level 0 as "Novice", Level 1 as "Intermediate", Level 2 as "Advanced" and Levels 3-5 as "Superior" (Clark & Clifford, 1988; Liskin-Gasparro, 1984; Lowe, 1988; Stansfield, 1992). Function, context, and accuracy comprise the three examined features of each level. The bundling of the upper levels denotes the complexity of language and progression of language over time (Liskin-Gasparro, 1984). Similar to the "+" designation in the ILR levels, the ACTFL/ETS scale added sublevels of "Low", "Mid", and "High" to specify the degrees of ability within each main level (Liskin-Gasparro, 1984; Lowe, 1988). The proficiency levels measured learners' listening, speaking, reading, writing, and culture competence in a language other than English.

The ACTFL Provisional Proficiency Guidelines (1982) were revised in 1986 and became the ACTFL Proficiency Guidelines (Liskin-Gasparro, 2003). The Guidelines included global descriptions for the different stages of proficiency. The ACTFL Proficiency Guidelines (1986) emphasized functional competency and the ongoing nature of language acquisition as opposed to measuring achievement in an isolated point in time (ACTFL, 1989; Breiner-Sanders, Lowe, Miles, Swender; 2000; Lowe, 1988). Thus, the guidelines continued to use the same nomenclature of "Novice", "Intermediate", and "Advanced" with sublevels of "Low", "Mid", and "High". The upper two levels were "Superior", and "Distinguished" (ACTFL, 1989). As a point of comparison, the ILR Level 3 is roughly equivalent to the ACTFL Superior level (Breiner-Sanders et al., 2000; Clark & Clifford, 1988; Lowe, 1988). In addition, further descriptions in reading and speaking domains defined skills in each of the levels.

Further revisions in 1999, 2001, and 2012 led to the current version of the guidelines. The ACTFL Proficiency Guidelines (2012) describe what individuals are able to do in the areas of speaking, writing, listening, and reading. The term "proficiency", which refers to abilities in real-world, unrehearsed, spontaneous contexts, contrasts communicative "performance", which is based on instruction and rehearsed content (ACTFL, 2012b; Lowe, 1988). The guidelines include "Distinguished", "Superior", "Advanced", "Intermediate", and "Novice" descriptions of abilities with regards to content, context, accuracy, and discourse (ACTFL, 2012b; Lowe, 1988). The sublevels of "High", "Mid", and "Low" further define the major levels of "Advanced", "Intermediate", and "Novice" (ACTFL, 2012b). Along with the ILR, the ACTFL Proficiency Guidelines document is one of the major frameworks for world language proficiency scales used in the United States, which serves as a foundation for the measurement of proficiency assessment instruments (U.S. Department of Defense, 2018).

Common European Framework of References for Languages (CEFR)

Prevalent in Europe, another major framework used to develop instruments to measure world language skills is the CEFR, which is divided into three major levels, "Basic User" or "A", "Independent User" or "B", and "Proficient User" or "C" (Little, 2006). Each level is further developed into two sublevels of "1" and "2" (Little, 2006). The Council of Europe published the final version of the CEFR in 2001 (Little, 2006). Both the ACTFL Proficiency Guidelines and the CEFR impact learning, instruction, and assessment (Tschirner, Bärenfänger, & Wanner, 2012). In 2010, the ACTFL-CEFR Alignment Conferences established the first correlations and interactions between the two frameworks (ACTFL, n.d.). Thereafter, a series of empirical validation studies determined that there are strong correlations between ACTFL proficiency assessments, ACTFL ratings, and the CEFR ratings (ACTFL, n.d.; Tschirner et al., 2012). The

ACTFL ratings of Intermediate correspond to CEFR ratings of A1.2 through B1.1 in the receptive (reading and listening) skills assessments, while Advanced corresponds to ratings of B1.2 through C1.1 (ACTFL, n.d.). In the productive (speaking and writing) skills assessments, ACTFL ratings of Intermediate correspond to CEFR ratings of A2 through B1.2, while Advanced corresponds to ratings of B2.1 through B2.2 (ACTFL, n.d.).

Definitions of Intermediate and Advanced Proficiency

As referenced in the introduction, students in the K-12 system in the United States who participate in a well-articulated world language program are able to attain intermediate levels of proficiency, but the need for advanced level speakers is urgent (A National Security Crisis, 2012; U.S. Department of Education, 2008; U.S. Department of Defense, 2005a, 2005b, 2018). For the purposes of this research study, the terms "Intermediate" and "Advanced" refer to the definitions of the proficiency levels per the ACTFL Proficiency Guidelines (2012).

According to the ACTFL Proficiency Guidelines (2012), Intermediate level speakers are able to "create with the language when talking about familiar topics related to their daily life. They are able to recombine learned material in order to express personal meaning. Intermediate level speakers can ask simple questions and can handle a straightforward survival situation. They produce sentence-level language, ranging from discrete sentences to strings of sentences, typically in present time. Intermediate-level speakers are understood by interlocutors who are accustomed to dealing with non-native learners of the language" (ACTFL, 2012b, p. 7). Advanced level speakers are able to "engage in conversation in a clearly participatory manner in order to communicate information on autobiographical topics, as well as topics of community, national, or international interest. The topics are handled concretely by means of narration and description in the major times frames of past, present, and future. These speakers can also deal

with a social situation with an unexpected complication. The language of Advanced-level speakers is abundant, the oral paragraph being the measure of Advanced-level length and discourse. Advanced-level speakers have sufficient control of basic structures and generic vocabulary to be understood by native speakers of the language, including those unaccustomed to non-native speech" (ACTFL, 2012b, p. 5).

The sublevels of "High", "Mid", and "Low" further define the speaker's abilities to use the target language in functional terms. The difference in each of the sublevels addresses the quantity and quality of the language that is produced. In the "High" sublevel, speakers "communicate with ease and confidence" and may function at the next major level, but unable to sustain without difficulty (ACTFL, 2012a, p. 5). In the "Mid" sublevel, speakers produce enough quantity of speech and quality or "efficiency and effectiveness with which meaning is communicated" at the major level (ACTFL, 2012a, p. 5). Speakers at the "Low" sublevel are able to function within the major level, but with "minimal quantity and quality of language and little or no demonstrated ability to perform the tasks of the next higher level" (ACTFL, 2012a, p. 5).

The term "proficiency" specifies the unrehearsed nature of the assessment when determining levels according the ACTFL Proficiency Guidelines (2012). Assessing proficiency assumes language ability in spontaneous situations in broad content and context (ACTFL, 2012b). In contrast, the assessment of "performance" refers to language abilities based on instruction and practice with the language in a familiar content and context (ACTFL, 2012b). Therefore, the term "proficiency" reflects language abilities in real-world contexts, rather than in an instructional setting, in which language is practiced for a specific context. World language

speakers vary in their proficiency levels and the manner in which they acquired their language(s), which categorizes the individual's learner type.

Learner Types

Individuals acquire, develop and strengthen their linguistic proficiency in diverse ways. The initial language onset and type of acquisition of the target language characterize the language learner type (Bylund, Abrahamsson, & Hyltenstam, 2012; Flege, Frieda, & Nozawa, 1997; Merino, 1983; Yeni-Komshian, Flege, & Liu, 2000). The language onset refers to the introduction of the target language to the individual and is operationalized as an age or age of onset (AO) (Unsworth, 2016; Yeni-Komshian et al., 2000).

Language Onset

Studies in the literature distinguish a maturational period of time that nativelike language attainment is achievable before neurological changes affect target language processing (Bylund et al., 2012; White & Genesee, 1996). These studies converge in the notion that the neurological changes that accompany puberty signify the end of the critical period of language (Bylund et al., 2012; Lenneberg, 1967 as cited in Singleton, 2003; Oyama, 1976; Seliger, 1978; White & Genesee, 1996). Proponents of the critical period hypothesis argue that language acquisition must occur before puberty, in which cerebral lateralization (or specialization of cognitive processes on one side or both sides of the brain) occurs (Lenneberg, 1967 as cited in Singleton, 2003). Several researchers agree that 12 years of age marks the end of the critical period for language acquisition (Oyama, 1976; Long, 1990; Scovel, 1969). Other researchers argue against the single explanation of the critical period hypothesis in favor of additional variables, such as the use of language, years of schooling, and years of residence in the target language community (Bialystok & Hakuta, 1999; Birdsong, 1999; Flege et al., 1997; Yeni-Komshian et al., 2000).

In a study of 195 adult native Spanish (first language or L1) speakers with Swedish as a second language or L2, the participants identified themselves as being native-like in the L2 (Abrahamsson & Hyltenstam, 2009). The participants ranged in various ages of language onset, which formed two comparison groups: AO equal to or less than 11 years old, and AO greater than or equal to 12 years old. The study revealed that the earlier the AO of the participant, the higher their perceived nativelike linguistic abilities in Swedish as perceived by Swedish-native judges (Abrahamsson & Hyltenstam, 2009).

In another study of 240 Korean, bilingual, adult emigrants to the United States whose target language was English with AO ranging from one to 23 years, participants represented a variety of experiences for language exposure (Yeni-Komshian et al., 2000). Some participants experienced an earlier AO for English as the L2 in required middle school, high school, or college English classes in the Korean school system. Others experienced an earlier AO upon arrival in U.S. elementary schools. In their study, Yeni-Komshian et al. (2000) categorized the Korean bilingual participants according to AO of English. All participants resided in the U.S. for a minimum of eight consecutive years, but some individuals completed high school in Korea, and others in the U.S. Participants completed a language test to ensure at least a fourth-grade language level in both English and Korean in order to qualify in the Korean bilingual group. Using pronunciation measures rated by native judges, this study reveals that the English pronunciation of participants with AO of 1-5 years was similar to that of a group of monolinguals, native English, university-level students. Participants with AO of 1-9 demonstrated stronger pronunciation in English than Korean, while those with AO of 12-23 years demonstrated the same pronunciation levels as the monolingual, native Korean, university-

level student group. This study demonstrates that the language experiences, not only age, are a factor in language abilities (Yeni-Komshian et al., 2000).

The research seems to suggest that different experiences lead to the acquisition of a language. Some speakers have learned the target language in formal courses, while others speak the target language as a mother tongue (Brecht & Ingold, 2002). Even among individuals who maintain the target language in the home, the terms "native speaker" and "heritage speaker" are distinct (Singleton & Pfenninger, 2019). Heritage speakers are bilinguals who speak the majority language (e.g., English in the U.S.) in addition to another home language that reflects the individual's ethnicity or culture, but to varying degrees of proficiency (Montrul, 2012). In contrast, the native speaker intuitively dominates the home language and recognizes the language in question as his or her first language since childhood (Cook, 1999). This research study recognizes and uses the constructs of the native and heritage speaker.

Native Speaker

Previous research literature sometimes claims a vague notion of the native speaker. In the 1980s, authors such as Edge (1988) and Paikeday (1985) argued that the native speaker was undefined due to a period of national identity concerns in the United States and a shift toward higher value on culturally authentic sources of language. Kramsch (1997) challenged the idealization of the native speaker as the sole authentic language source by birthright. In accordance with Kramsch's (1997) sociocultural perspectives of world language speakers, Davies (2004) maintains that the determination of an individual as a native speaker is a matter of personal identity. For example, some individuals identify themselves as a native speaker by exposure to the language from birth or in early childhood (Davies, 2004). Other native speakers categorize themselves as such due to residence in the target language country for a prolonged

period of time (Abrahamsson & Hyltenstam, 2009; Davies, 2004). Still, other speakers demonstrate native-like or near-native language abilities, as verified by language tests and native-speaker judges in the literature (Davies, 2004; Hyltenstam & Abrahamsson, 2000; White & Genesee, 1996).

However, the current literature suggests that the common denominator in defining the native speaker is that the language in question is the individual's first language (Cook, 1999). In other words, an individual cannot claim to be a native speaker of a language that was not learned at a young age (Cook, 1999). Others, such as Rampton (1990) assert that being native to a language does not necessarily guarantee high abilities in the language. In the same vein, further studies show that late learners of the language can demonstrate native-like abilities (Birdsong, 1999; White & Genesee, 1996).

For the purposes of this study, the native speaker construct includes the characteristic that the individual has acquired the language in childhood as a first language and in a corresponding native language environment (Birdsong, 1999; Cook, 1999; Davies, 2004; Medgyes, 1992; Medgyes, 2001). In addition, the native speaker internalizes or owns the target language (Cook, 1999; Davies, 2004; Kramsch, 1997), and, thus, reflects language control and intuition regarding correct use of the language (Abrahamsson & Hyltenstam, 2009; Cook, 1999; Davis, 2004). Acquisition in childhood implies cultural understanding in the pragmatics and a sense of membership as a cultural and linguistic insider of the target language (Davies, 2004; Kramsch, 1997). In addition, native speakers are able to use the target language for creative purposes, such as authorship and entertainment, which the native language community accepts and enjoys (Davies, 2004).

Heritage Speaker

Heritage speakers are children of families who have immigrated to another country at a young age, in which their mother tongue is not the majority language (Aalberse & Muysken, 2019; Brecht & Ingold, 2002; Goral, 2019; Singleton & Pfenninger, 2019). In the United States, a heritage language speaker speaks to some degree and or understands the language in addition to English (Benmamoun, Montrul, & Polinsky, 2013; Brecht & Ingold, 2002; Montrul, 2005; Polinsky, 2008; Polinsky & Kagan, 2007; Valdés, 2014).

The language attrition of the mother tongue in favor of the majority language is a common linguistic dynamic of heritage speakers (Aalberse & Muysken, 2019; Brecht & Ingold, 2002; Keijzer & de Bot, 2019; Lacorte & Canabal, 2003; Montrul, 2005; Polinsky, 2008; Singleton & Pfenninger, 2019; Valdés, 2014). Language attrition is defined as a loss of proficiency in one language over the other due to the limited exposure or decreased use (Bot, Weltens & Van Els, 1985; Goral, 2019; Keijzer & de Bot, 2019; Köpke, 2019; Van Els, 1986). Brecht and Ingold (2002) assert that heritage languages are fragile over time without interventions to maintain the L1 or continued levels of input (Montrul, 2005). Valdés (2001) notes generational patterns in which a first-generation immigrant is monolingual in the heritage language, the second and third generations are dominant in the heritage language, and in the fourth generation, the heritage language attrites making the speaker English (or L2) dominant. Furthermore, the complexity of first-generation class affects the strength of heritage language in the next generation (Valdés, 2001). Related to social class is the individual's level of education. Studies in the literature reveal that individuals with higher education levels show less language attrition (Jaspaert & Kroon, 1989; Köpke & Schmid, 2004).

In a study of over 1,000 fifteen-year-old students in England, self-reported oral and literal proficiency skills demonstrate the effect on language over generations (Parameshwaran, 2014). In the study, "oral proficiency" refers to listening and speaking skills, while "literal proficiency" refers to reading and writing skills (Parameshwaran, 2014). Participants varied in AO, ethnic origin, gender, and educational background of parents. Participants were grouped in the following generational groups based on age of arrival to the destination country - England or AOA, and if the student's place of birth was abroad: 1.25, 1.5, 1.75. In a study, Parameshwaran (2014) identified second generation as the participant's birth in the United Kingdom with both parents born abroad, while 2.5 distinguished that one parent was born abroad, but the other parent was born in the UK. Third generation and higher signifies that the student and parents were born in the UK. The study revealed that the mean scores of both the oral and literal proficiency skills in the L1 clearly declined for each generation, while the L2 scores increased over the generations.

The reviewed literature reveals that the earlier the development of the majority language or L2, the greater the language attrition of their first language or L1 if there is lack of use (Brecht & Ingold, 2002; Bylund et al., 2012; Davies, 2004; Montrul, 2005). For example, the individual may immigrate to an environment in which their language is the minority during later school years or as an adult. The ability to maintain the L1 that is different than the majority language of the community depends on the amount of L1 input the speaker receives in order to maintain the language over time (Bylund et al., 2012; Montrul, 2005; Singleton & Pfenninger, 2019).

In a longitudinal study conducted over three years by Jia and Aaronson (2003), ten Chinese-speaking individuals with AOA between five and 16 years old demonstrate the variety of proficiency level of heritage speakers. Although the AOA varied, all participants immigrated

to the U.S. within one year of one another, and all attended school. All but one individual lived with both parents during the study. All parents had formal education with a minimum of college degrees. Using quantitative tasks measures and qualitative interviews, the results reveal that the younger participants (age ≤ 9) preferred English within the first year, had a richer English environment, and were more proficient in English than in L1 by the end of the study. The older students (age ≥ 12) preferred their L1 during the study, had a richer L1 environment, and maintained their L1 as the dominant language. Therefore, the proficiency levels of heritage language speakers vary widely (Brecht & Ingold, 2002) and depend on the interactions, preferences, and language environment of the individual (Jia & Aaronson, 2003; Singleton & Pfenninger, 2019).

The loss of L1 in an L2 environment, as described in the Jia and Aaronson's (2003) study fits the framework of language attrition first developed by Bot and Welten (1985) and later re-organized with similar content by Van Els (1986). In the original framework, Bot and Welton (1985) organize L1 and L2 as a function of the linguistic environment. Specifically, L1 attrites in an L2 environment and L2 attrites in an L1 environment (Bot et al., 1985). The younger the individual onsets in an L2 environment, the faster the L1 attrites (Köpke & Schmid, 2004). More specifically, the length of time in an L2 environment with minimal or no contact with the L1 affects language dominance and eventually attrition (Köpke & Schmid, 2004).

Non-Heritage World Language Speaker

A foreign or world language speaker is an individual who learned a language outside of the home, neither as a language of society nor as a language of culture in which he or she lives (Lacorte & Canabal, 2003; Muñoz & Spada, 2019). For the purposes of this study, the individual who learns another language that is not spoken in the home is defined as a "non-heritage world

language" or NHFL speaker. These individuals have acquired the language through school, another form of instruction or because of extended time in a country where the target language dominates (Grin, 2019). While the native and heritage speakers internalize the structure and use of the language (Valdés, 2014), the traditional world language speaker needs to learn such foundational components of the target language (Brecht & Ingold, 2002; Valdés, 2014). However, proficiency levels of the heritage speaker vary and may imitate the skills of a non-heritage world language speaker (Kondo-Brown, 2005).

In a study (Kondo-Brown, 2005) of 185 incoming-university Japanese speakers, a questionnaire placed the students into the group of Japanese Heritage Language based on ethnic descent (JHL Descent), having at least one Japanese parent (JHL Parent), having at least one Japanese grandparent (JHL grandparent), or as a non-heritage Japanese foreign language speaker (JFL). Using proficiency test scores of listening and reading comprehension, and grammatical knowledge, the results indicate that JHL Parent group scored higher in all portions of the proficiency test compared to the other groups. However, the means of the JHL Descent, JHL Grandparent, and JFL groups were nearly identical in all three portions of the test (Kondo-Brown, 2005).

The differences in proficiency outcomes of the non-heritage world language speaker vary. Factors in the literature that contribute to the understanding of variation in proficiency outcomes include student motivation (MacIntyre et al., 2002; Shedivy, 2004; Tse, 2000), and cognitive and affective variables (Onwuegbuzie et al., 2000). In a study by Onwuegbuzie et al. (2000), the authors determine which variables are the strongest predictors of world language proficiency. The dataset includes 184 college and graduate students of a wide range of areas from one university. Six different instruments are used to test world language anxiety, social

interdependence, self-perception, control over academic outcomes, and study habits. This study differs from previous studies in that a combination of those variables and a variety of world language levels are represented in the study. The findings reveal that the cognitive variable of achievement and affective variable of world language anxiety levels explain the largest variance in world language achievement. The combination of low achieving and high anxiety students reveals the lowest world language achievement. The findings bring awareness to the negative role that high anxiety coupled with low achievement plays in the acquisition of a language for non-heritage LOTE students.

Conclusion

The literature reviewed for this study confirms that there is a need for advanced speakers of languages in the U.S. (Malone et al., 2003; U.S. Department of Defense, 2005a, 2005b, 2018; U.S. Department of Education, 2008). The same body of literature describes the various entry points of learning a language combined with the features of their language abilities, which categorize speakers into different learner types (Bylund et al., 2012; Flege et al., 1997; Merino, 1983). The learner type relationship to proficiency level outcomes is also corroborated by the literature (Jia & Aaronson, 2003; Kondo-Brown, 2005; Parameshwaran, 2014; Yeni-Komshian et al., 2000). There are abundant examples in the literature regarding the construct of the native speaker (Abrahamsson & Hyltenstam, 2009; Davies, 2004) and heritage speaker (Brecht & Ingold, 2002; Montrul, 2005; Polinsky, 2008; Valdés, 2001).

Several studies also reveal that there are instances in which the non-native speaker can achieve native-like abilities (Abrahamsson & Hyltenstam, 2009; Birdsong, 1999). Other studies examine the areas of strength of the native speaker in comparison to the heritage speaker (Yeni-Komshian et al., 2000). Early generation heritage and native speakers may have more years of

language exposure that potentially position them ahead of non-heritage world language learners (Jia & Aaronson, 2003; Montrul, 2005; Parameshwaran, 2014). The U.S. has an "untapped reservoir of linguistic competence" (Brecht & Ingold, 2002, p. 2) of heritage languages as a national resource (Brecht & Ingold, 2002). Given the millions of heritage and native language speakers in the U.S. (Brecht & Ingold, 2002), what is needed in the literature is a further exploration of their proficiency skills.

The next steps are to explore the heritage and native language proficiency abilities within the researcher's professional context through a needs assessment. The needs assessment informs the organization of which language skills (listening, reading, writing, speaking) manifest themselves as strengths in proficiency according to the ACTFL proficiency levels between native and heritage speakers. The purpose of the needs assessment is to determine if the student proficiency levels of a LOTE differ for heritage and native speaker categories in the author's professional organization.

Although there are many factors associated with the problem of the lack of advanced language proficiency in the U.S., this study focuses on the examination of native and heritage speakers and their process of moving into the Advanced level of linguistic proficiency on the ACTFL scale. The deep understanding of the skillset of LOTE speakers responds to the well-documented problem of a national crisis (U.S. Department of Defense, 2005a, 2005b, 2018; U.S. Department of Education, 2008). The strengthening of world language capacity in the workforce meets the needs of the U.S. in a 21st century global context that addresses multilingual skills in light of national security interests (Clifford & Fischer, 1990; Malone et al., 2003; Robinson et al., 2006; Robinson-Stuart & Nocon, 1996; Tochon, 2009; U.S. Department of Defense, 2005a, 2005b, 2018; U.S. Department of Education, 2008).

Chapter 2: Empirical Examination of the Problem

The U.S. is fortunate to have a national treasure of individuals with varied linguistic abilities in a multitude of languages (Brecht & Ingold, 2002). However, speakers of languages other than English (LOTE) have diverse life experiences that lead to various linguistic proficiency outcomes. There are various entry points to learning a world language, which categorize the language learner type as a heritage, native, or non-heritage speaker (Brecht & Ingold, 2002; Unsworth, 2013; Valdés, 2014). The studies cited in chapter one substantiate that speakers of the same world language vary in proficiency levels. Currently there is a dearth of recent studies focusing on learners' proficiency skills using the ACTFL proficiency levels in relationship to learner types enrolled in our American school system. The key purpose of this empirical study is to examine the levels of proficiency vis-à-vis the following learner types: heritage (H), native (N), and non-heritage foreign language (NHFL) speaker in the researcher's professional organization, a school district in Texas.

Context of Study

In Texas, students need at minimum of two credits of world language (LOTE) under the current high school graduation plan (Texas Education Agency, 2014a). The state standards, Texas Essential Knowledge and Skills (TEKS), define the ending proficiency levels (Novice, Intermediate, Advanced) and sublevels (Low, Mid, High) after each course using the ACTFL Guidelines described in chapter one. Level 1 (one credit) students are expected to reach the Novice level at a Mid-High sublevel, or Novice-Mid to High, while Level 2 (two credits) students are expected to reach between Novice-High to Intermediate-Low (Texas Education Agency, 2014b). In Level 4 (four credits), students demonstrate a proficiency level of Intermediate Mid to Intermediate High.

Earning World Language Credit by Examination

Although the state requirement in Texas calls for only two credits of a world language (specifically called Language Other Than English or LOTE as the required subject area) for high school graduation for all learner types, students in the researcher's school district have the opportunity to earn up to six world language high school credits in Spanish beginning in middle school. High school campuses offer world language courses from Levels 1 through 6 (Advanced-Low to Advanced-Mid) in Spanish, French, German, and Latin. Japanese and American Sign Language courses are offered up to Level 4 (Intermediate-Mid to Intermediate High). Students, such as heritage or native speakers, who already have a background in a LOTE, may opt out of taking the courses by demonstrating their proficiency skills through a Credit by Examination (CBE) (Texas Education Code §28.023), which can award them up to four credits of LOTE in 36 available languages depending on their results.

The use of CBEs provides opportunities for students to gain credit without formally enrolling and completing those courses (Texas Education Agency, 2014c). Such exams recognize that students can acquire content through different types of learning experiences outside of the classroom (Pressey, 1945). This is noteworthy, given the previous discussion regarding language acquisition from home environments for heritage and native speakers. Students can gain language skills outside of the classroom, such as through authentic resources, relationships, and social conversations (Eaton, 2012; Unsworth, 2016). Although the literature is scant regarding CBE offerings in high school, several older studies highlight the characteristics of CBEs at the college level (Kreplin, 1971; Mahoney, 1993; Pressey, 1945). Based on the student's performance on the CBE, the institution awards the corresponding semester hours or course credit (Kreplin, 1971; Mahoney, 1993).

Existing CBE proficiency exam results of middle school (6^{th}-8^{th}) and high school (9^{th}-12^{th}) students who are enrolled in a K-12 public school district in a large suburb in Texas serves as the dataset for this study. In this school district, there are about 12,000 middle school students and 16,778 high school students. The data sample includes 150+ test results of students (middle and high school) who have a background in a world language and chose to take a CBE to gain LOTE credits without taking the course.

Upper-Level Course Enrollment

After meeting the required LOTE credits through one of the two methods mentioned above (successful completion of course or credit by examination), only a fraction of students continues their enrollment in upper-level courses in the researcher's school district. In the 2019-2020 school year, 626 (or 3.7%) out of 16,778 high school students enrolled in Level 3 (Intermediate-Mid) courses, which exist for Spanish, French, German, Latin, or American Sign Language (ASL). Given that all high school students must complete Levels 1 and 2 of any available language courses, the Level 3 enrollment illustrates a loss of about 96% of students who discontinue advanced language study. A total of 414 students (2.5%) enrolled in Level 4 (Intermediate-High) language courses. Only 60 students (0.4%) enrolled in Level 5 (Advanced-Low) and 38 students (0.2%) enrolled in Level 6 (Advanced-Mid), which are available for Spanish, French, German, and Latin languages.

In this school district, campuses present an articulated sequence of world language course levels that enable students to reach up to the Advanced-Mid proficiency level. However, the school district's course enrollment data demonstrate that most students (96%) ended their world language pathway after completing Level 2. The successful completion of a Level 2 course in Texas signifies that the student demonstrated language skills at the Intermediate-Low proficiency

level. According to the corresponding course description per ACTFL Proficiency Guidelines (2012b), students "handle successfully a limited number of uncomplicated communicative tasks", but "conversation is restricted to some of the concrete exchanges and predictable topics necessary for survival in the target-language culture" (p. 8). Thus, these statistics reflect the claim that students in the U.S. mostly gain up to Intermediate proficiency through the K-12 conduit for world language study (Malone et al., 2003; O'Rourke et al., 2016).

Further Study of Credit By Examination Participants

This study aims to provide further insight on the learner type of the students who choose to take the Credit By Examination (CBE) for LOTE credit. The knowledge gained provides perspective for the school district on which learners have considerable proficiency skills in a LOTE. It also informs local and national school districts of the possibilities for current and future heritage/native language courses that seek to maintain and grow language proficiency, culture, and identity of representative student groups.

This empirical study further examines the learner types and their corresponding levels of linguistic proficiency in the four language domains: listening, speaking, reading, and writing. Due to the consensus in the language learning profession that individuals with academic experiences in the target language gain literacy skills, some past studies recommend that reading and writing skills should be separately reported from speaking and listening skills (Köpke, 2004; Parameshwaran, 2014). In accordance with the terminology presented in previous studies, this study also distinguishes oral proficiency (listening and speaking skills) from literal (reading and writing competence) skills (Köpke, 2004; Parameshwaran, 2014). The researcher seeks to determine the relationships between oral proficiency, literal proficiency, and composite proficiency (oral and literal combined) and learner type.

The first research question for the needs assessment assesses how different composite levels of proficiency manifest themselves in diverse learner types in a variety of languages. The second research question aims to determine which of the linguistic skills are strengths for heritage and native speakers of a LOTE. The specific research questions that drive the needs assessment are:

1. Is there a relationship between learner type (heritage and native) and composite proficiency levels for students who speak a language other than English (LOTE)?

The null hypothesis (H_0) and alternative hypothesis (H_1:) are:

H_0: There is no difference in means for composite proficiency between heritage and native speakers who speak a LOTE.

H_1: There is a difference in means for composite proficiency between heritage and native speakers who speak a LOTE.

2. Is there a difference in mean scores for oral proficiency between native and heritage speakers of a LOTE?

The null hypothesis (H_0) and alternative hypothesis (H_1:) are:

H_0: There is no difference in means for oral proficiency between heritage and native speakers who speak a LOTE.

H_1: There is a difference in means for oral proficiency between heritage and native speakers who speak a LOTE.

3. Is there a difference in means for literal proficiency between native and heritage speakers of a LOTE?

The null hypothesis (H_0) and alternative hypothesis (H_1:) are:

H_0: There is no difference in means for literal proficiency between heritage and

native speakers who speak a LOTE.

H_1: There is a difference in means for literal proficiency between heritage and native speakers who speak a LOTE.

Through this needs assessment, the researcher seeks to identify and compare the specific strengths in language skills between heritage and native learner types.

Methodology

Participants and Sampling

The assessment results of a group of students who elected to take a world language Credit By Examination (CBE) option and earned four academic credits serves as the target data sample for this research study. The rationale for this filter rests in the ACTFL proficiency Guidelines and the state administrative code for awarding academic credits. A student who demonstrates a composite proficiency level of Intermediate-Mid to Intermediate High according to the ACTFL proficiency scale (2012b) earns four academic credits. As an Intermediate-Mid level speaker, the student is able to create language, express personal meaning, ask questions, and hold a conversation with sufficient quantity and quality of speech (ACTFL, 2012a). As an Intermediate-High level speaker the student communicates with confidence and demonstrates abilities of the next major level (Advanced) (ACTFL, 2012a). An Advanced level proficiency speaker is one who "communicates information on autobiographic topics, as well as topics of community, national, or international interest in a real-world, spontaneous, unrehearsed context in paragraph level discourse with control, accuracy, and clarity using a wide range of vocabulary" (ACTFL, 2012a, pp. 5-6).

The student at an Intermediate-High proficiency level falls short of the Advanced level due to the individual's inability to sustain language at that level without "intermittent lapses or

evidences of difficulty" (ACTFL, 2012a, p. 5). Nonetheless, the accomplishment of earning four credits on the proficiency exam evidences Intermediate-Mid to High language proficiency. Therefore, students in the target sample evidence the ability to hold a conversation with ease and are capable of communicating, thus fulfilling the construct as an assured "speaker" of another language.

The sample for the needs assessment reflects a non-random convenience sample. The researcher had access to these pre-existing proficiency data through her role in the school district. The available access to participants for the purposes of this research study defines the convenience sampling method (Pettus-Davis, Grady, Cuddeback & Scheyett, 2011). The target sample is appropriate to examine the research questions, which leads to understanding the proficiency skills of different learner types. Although the samples may or may not represent students who have taken world language courses in the American K-12 system, the sample represents a filtered section of students who demonstrate communicative abilities of a LOTE. The use of existing datasets to collect information on minors is approved by the Homewood Institutional Review Board (HIRB) at Johns Hopkins University (# HIRB00009287).

Measures

In this needs assessment, several constructs are operationalized. The constructs consist of the learner types (native and heritage speaker) and linguistic proficiency. The researcher uses various instruments to measure these constructs within the existing data provided by the school district targeted for this study.

Learner type. Beginning with a comprehensive list of all students who took a world language Credit By Examination (CBE) in the school district, the researcher filtered the dataset for all students who earned four academic credits. The CBE includes simple biographical data

and profile questions which provide the necessary information to categorize the participant as heritage (H) or native (N). The profile includes questions about the frequency of the target language spoken at home and by whom, the number of years that the student formally studied the language, if the student studied the language in a context abroad, and for what length of time. The biographical profile informs the classification of learner type.

The classification of learner type is based on the discussion in chapter one regarding the significance of the critical period hypothesis (Bylund et al., 2012; Lenneberg, 1967 as cited in Singleton, 2003; Oyama, 1976; Seliger, 1978), L1 language attrition (Bot et al., 1985; Köpke & Schmid, 2004; Montrul, 2005), and the age of onset (AO) for L2 (Abrahamsson & Hyltenstam, 2009), which in this case is English. In this study, AO is synonymous with age of arrival to the U.S., since all participants are part of the formal school system. If the AO of L2 is greater than or equal to 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000), the researcher recorded the participant as "N" (native speaker). If the AO of L2 is less than 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000), the researcher recorded the participant as "H" (heritage speaker). In cases where the student failed to answer the profile questions, the scores were not used in the study. After the classification of the learner type, the author established if there was a statistical difference in the mean score between the composite proficiency levels of the heritage versus native speaker groups.

Proficiency. The ACTFL Proficiency Guidelines (2012) operationalize proficiency levels and sublevels. The Advanced level is of particular interest for this research study due to the high levels of communicative competence required for matters of national security, international relations, and economic opportunities (U.S. Department of Defense, 2005a, 2005b; U.S. Department of Education, 2008). According to the ACTFL Proficiency Guidelines (2012b),

an Advanced proficiency speaker communicates "on autobiographical topics, as well as topics of community, national, or international interest" (p. 5) in a spontaneous context with paragraph length discourse. The school district uses Avant Assessment proficiency tests as the approved instruments to determine the linguistic performance of learners who elect to meet their world language requirements by Credit By Examination (CBE). Avant Assessment employs the ACTFL Proficiency Guidelines to determine student linguistic performance scores. The next section provides further discussion of the Avant Assessment proficiency tests.

A student may score at the Novice, Intermediate, or Advanced in listening, reading, speaking, and/or writing portions of the linguistic proficiency exam. Test takers receive a benchmark level or interval score of one to nine for the listening and reading sections and one to eight for the speaking and writing sections (Avant, 2019a). The intervals correspond to the major levels and sublevels according to the ACTFL Proficiency Guidelines. According to the Avant Assessment Benchmark Rubric Guide (2019a), a score of "1", "2", or "3" corresponds to the Novice level with the sublevels of "Low", "Mid", and "High", respectively. A score of "4", "5", or "6" corresponds to the Intermediate-Low through High (ACTFL, 2012b) sublevels, respectively. A score of "7", "8", or "9" corresponds to the Advanced-Low through Advanced-High (ACTFL, 2012b).

Instrumentation

This study uses existing data of scores from two computer-based, adaptive proficiency assessments developed by Avant Assessment: Standards-based Measurement of Proficiency (STAMP) 4S and WorldSpeak. The school district employs these instruments as approved tests for the CBE. Available in 14 different languages, the STAMP 4S tests proficiency skills in listening, speaking, reading, and writing (Avant, 2019b). Available in 18 different languages,

the WorldSpeak tests proficiency skills in the productive skills of speaking and writing of less commonly taught languages (Avant, 2019c). Students take either test online. The productive skills (speaking and writing) are scored by certified raters who met standards for inter-rater reliability (Avant, 2019b, 2019c). As previously discussed, the scores of the exam correspond to ACTFL proficiency levels and sublevels.

The above referenced instruments meet the criteria of external validation and reliability (Clark, 2012a, 2012b, 2012c, 2012d). In the development of the instruments, an adaptive field test provided empirical information on the test items. Reading and listening sections were analyzed using Rasch methodology and determined as accurate for identifying the participants appropriate proficiency level (Clark, 2012a, 2012b, 2012c, 2012d). Internal and external reviews provided feedback for revisions or additions (Clark, 2012a, 2012b, 2012c, 2012d).

Procedure

Data Collection

The needs assessment described in this chapter utilizes existing data of scores from the Credit By Examination (CBE) for world languages in the school district. Students may take the CBE anytime during the school year. However, the peak times for volume testing are in the summer before class schedules are established and the school year begins and toward the end of the first semester in anticipation of the spring semester. Therefore, the data collection includes existing datasets featuring student scores from May 2018 to September 2019. Upon examining the results of the CBE, the researcher filtered the complete dataset of test takers and scores to include only students who scored high enough to earn four credits. As described in the previous section, students who are eligible to earn four academic credits, demonstrate their well-defined

communicative abilities in the target language in accordance with the ACTFL Proficiency Guidelines.

To respond to each of the research questions targeted to this study, the researcher compared the scores of heritage and native learner types. Therefore, the first step in data preparation was to determine which students are heritage (H), native (N), and non-heritage foreign language (NHFL) speakers. Using the self-reported biographical data preceding the STAMP 4S and WorldSpeak test scores as described in the discussion on learner type constructs, the researcher categorized the student as H, N, or NHFL. Due to the small sample size (n = 3), NHFL students were not considered in data analysis. Table 2.1 represents the number of H, N, and NHFL learner types within the dataset.

Table 2.1

Learner Types of Participants per Proficiency Exam

Exam	Learner Type	Number	Total
STAMP 4S	N	32	
	H	89	124
	NHFL	3	
WorldSpeak	N	25	26
	H	1	
	NHFL	0	
All			150

This filtered selection of 150 H and N students who earned four credits on the CBE served as the dataset for the quantitative analysis of the research questions for this study. Using SPSS, the researcher recoded native speakers into a numeric value as “1” and heritage speakers as “2”.

The researcher recoded the various tested languages represented within the dataset into numeric values in preparation for the data analysis. Table 2.2 describes all test languages of the participants.

Table 2.2

Languages and Codes

Language	Code
Spanish	1
Korean	2
Mandarin Simplified	3
Polish	4
Italian	5
Japanese	6
Arabic	7
Chin	8
Vietnamese	9

Although the initial dataset represents nine different languages, some languages do not include a large enough sample size to be included in the data analysis.

Data Analysis

In order to respond to the aspect of the research questions pertaining to the proficiency between the two learner types, the researcher computed the composite proficiency (Research Question 1), oral proficiency (Research Question 2), and literal proficiency (Research Question 3) variables. The composite proficiency variable consists of the sum of the listening, speaking, reading, and writing interval scores. The oral proficiency variable is the sum of the listening and speaking scores. The literal proficiency variable is the sum of the reading and writing scores. The composite proficiency, oral, proficiency, and literal proficiency scores serve as the dependent variables in this study. Only the STAMP 4S assessment includes all four language skills of listening, speaking, reading and writing. Therefore, all proficiency variables are

calculated using the STAMP 4S data only. Table 2.3 illustrates the descriptive statistics for proficiency for all tests (n = 125) within the data sample, which are delineated in Table 2.1.

Table 2.3

Composite Proficiency of All Language Tests

Subscale	N	Mean	Standard Deviation
Proficiency Composite	125	26.03	2.80
Oral Proficiency	125	13.26	1.61
Literal Proficiency	125	12.77	1.67

To answer the research questions, the researcher ran frequency tables of the proficiency variables (composite, oral, and literal). When examining the frequency distributions of these variables, none of the histograms shows symmetry on either side of the tails with a definitive peak around the mean (see Figures 2.1 and 2.2).

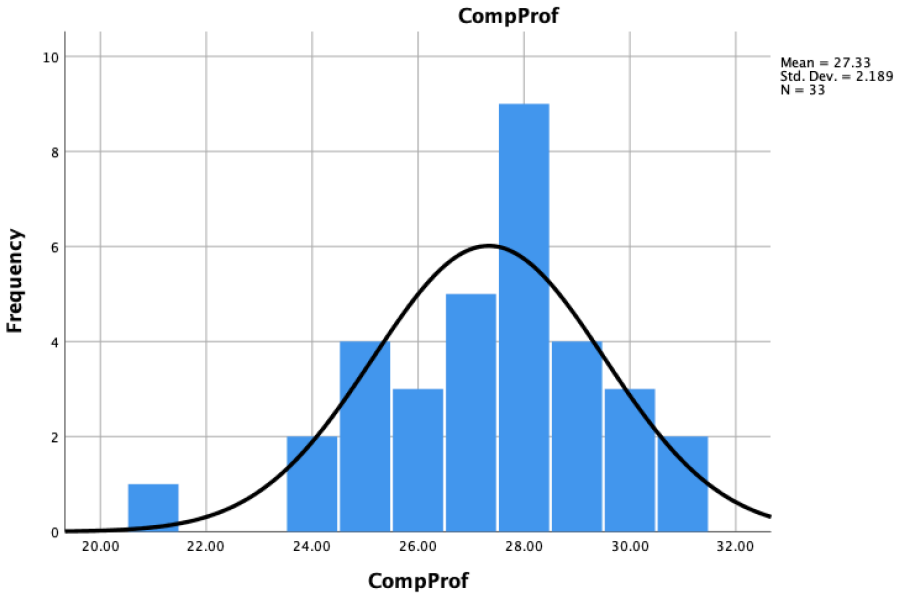

Figure 2.1. Histogram of Frequency Distribution for Native Speaker Composite Proficiency

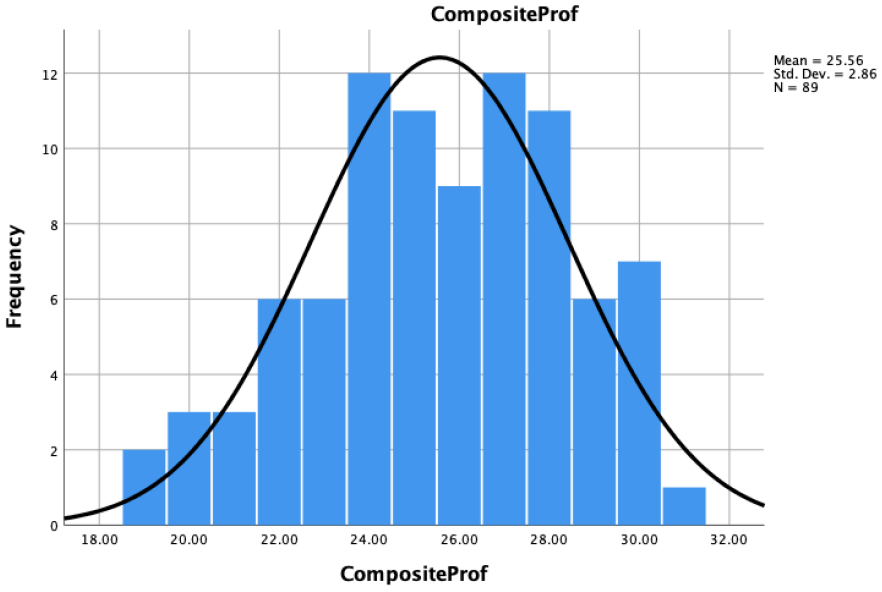

Figure 2.2. Histogram of Frequency Distribution for Heritage Speaker Composite Proficiency

The dataset does not have a normal distribution with symmetrical tails on both sides of the curve. Therefore, the composite, oral, and literal proficiency, which serve as dependent variables in the first, second, and third research questions, are non-parametric. Non-parametric datasets do not assume normal distribution (Knapp, 2017). Therefore, the researcher used the Mann-Whitney U test to examine the differences in mean scores for this research study.

Assumptions

The Mann-Whitney U test examines the difference in mean scores of the composite proficiency scores for heritage and native speakers. The identification of a continuous dependent variable and a categorical independent variable are assumptions for utilizing the Mann-Whitney U test (Knapp, 2017). The three calculations of proficiency (oral, literal, and composite) result in continuous dependent variables. The categorical independent variable of learner type is a string variable which the researcher converted to numeric values. In this study, the string variables of "native" and "heritage" are recoded into "1" and "2", respectively. Thus, the variable assumptions are met for employing the Mann-Whitney U test for this research study.

The Mann-Whitney U requires an independence of observations as another assumption prior to the use of this statistical test (Laerd Statistics, 2015). Independence of observations demonstrates that there is no relationship in the data between one group and the other (Laerd Statistics, 2015). In this case, participants completed the CBE on one occasion only. Therefore, this dataset meets the assumption of independence of observations. Finally, population pyramid histograms of composite proficiency demonstrate dissimilar shaped distributions between heritage and native learner types (see Figure 2.3). Figure 2.4 provides the histogram of oral proficiency by heritage and native learner types. Figure 2.5 illustrates the literal proficiency of both groups. The histograms reveal that both learner type groups have differently shaped

distributions by observation, which further confirm the non-normal distribution of the dataset (Laerd Statistics, 2015).

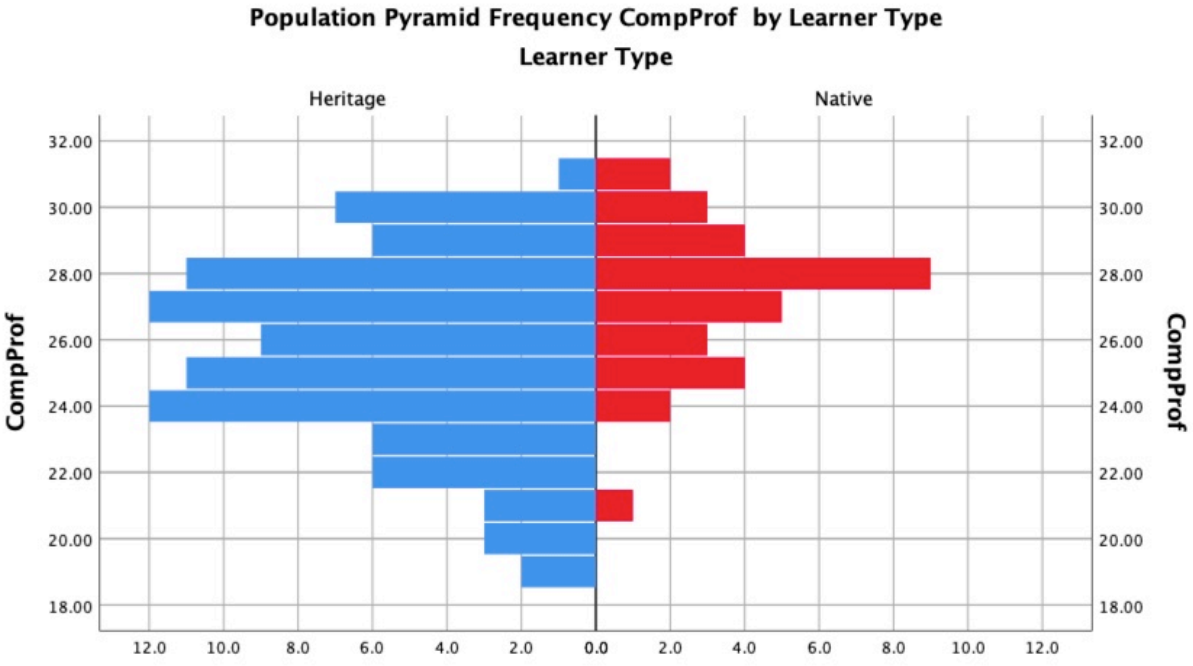

Figure 2.3. Histogram of Population Pyramid for Composite Proficiency by Learner Type

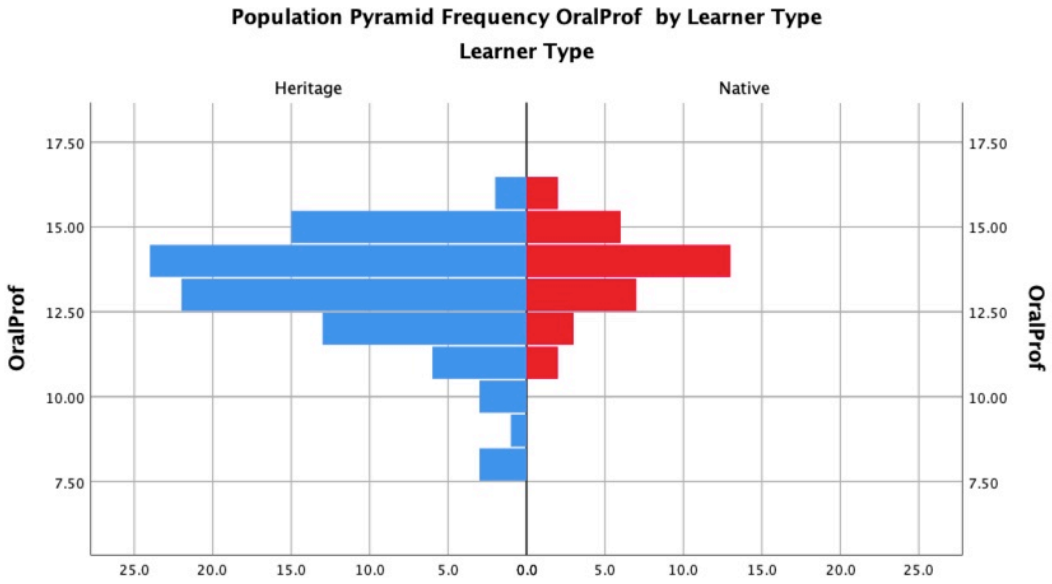

Figure 2.4. Histogram of Population Pyramid for Oral Proficiency by Learner Type

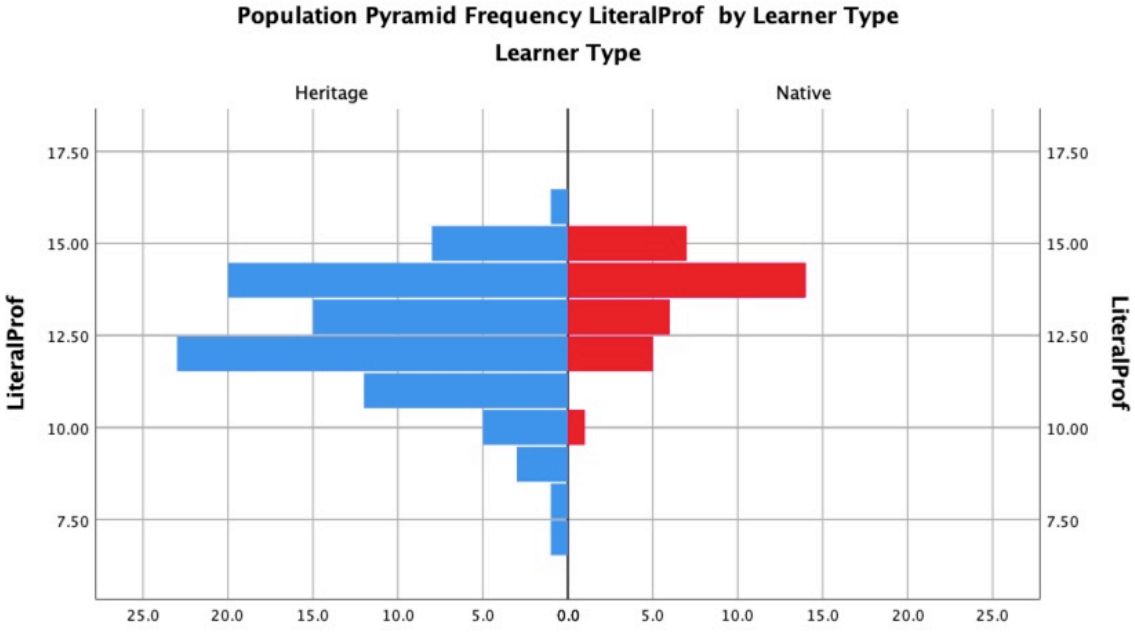

Figure 2.5. Histogram of Population Pyramid for Literal Proficiency by Learner Type

Since all assumptions for the Mann-Whitney U test are met, a comparison of mean ranks and the asymptotic-derived *p*-value is conducted for all three dependent variables to answer the research questions.

Findings and Discussion

The first research question consists of the dependent variable of the proficiency composite score and the independent variable of learner type. The descriptive outcomes of the Mann Whitney U test indicate the following mean rank table outcomes listed in Table 2.4.

Table 2.4

Mean Rank Table for Proficiency Composite

Learner Type	N	Mean Rank	Sum of Ranks
Native	33	77.88	2570.00
Heritage	89	55.43	4933.00
Total	122		

The rank table of the proficiency composite indicates that the mean rank for native and heritage speakers differs by 22.45. Since the native speaker mean rank is higher than the heritage mean rank, the results indicate that the native speaker group has higher proficiency levels when considering combined literal and oral proficiency levels. Since the mean ranks are disparate between native and heritage speakers, the researcher concludes that the categorization of learner type affects the proficiency composite. Table 2.5 provides the test statistics for the Mann-Whitney U test.

Table 2.5

Test Statistics of Mann-Whitney U Test for Proficiency Composite

Statistics	Proficiency Composite
Mann-Whitney U	928.00
Wilcoxon W	4933.00
Z	-3.135
Asymptotic Significance (2- tailed)	.002

Since $p < 0.05$, results are statistically significant ($U = 928.00$, $p = .002$). The results indicate a statistical difference in composite (sum of listening, speaking, reading, and writing scores) proficiency between native and heritage speakers. The results of the Mann-Whitney U test indicate a failure to accept the null hypothesis. Therefore, the alternative hypothesis is accepted. There is a difference in means for composite proficiency between heritage and native speakers who speak a LOTE.

The second research question examines if there is a difference in oral proficiency between heritage and native speakers as depicted in Table 2.6 below.

Table 2.6

Mean Rank Table for Oral Proficiency

Learner Type	N	Mean Rank	Sum of Ranks
Native	33	70.65	2331.50
Heritage	89	58.11	5171.50
Total	122		

As in the case of the composite proficiency, there is a difference in mean rank of 12.54 between the native and heritage speakers. Test statistics for the Mann-Whitney U test show that p 0.05 as outlined in Table 2.7.

Table 2.7

Test Statistics of Mann-Whitney U Test for Oral Proficiency

Statistics	Oral Proficiency
Mann-Whitney U	1166.50
Wilcoxon W	5171.50
Z	-1.785
Asymptotic Significance (2- tailed)	.074

Since p 0.05, the results are not statistically significant. The lack of statistical significance (U = 1166.50, p = .074) indicates that there is no statistical difference in oral proficiency between heritage and native speakers. The results of the Mann-Whitney U test indicate a failure to reject the null hypothesis. There is no difference in means for oral proficiency between heritage and native speakers who speak a LOTE.

Finally, the third research question examines if there is a difference in literal proficiency between heritage and native speakers as depicted in Table 2.8.

Table 2.8

Mean Rank Table for Literal Proficiency

Learner Type	N	Mean Rank	Sum of Ranks
Native	33	79.36	2619.00
Heritage	89	54.88	4884.00
Total	122		

As in the case of composite and oral proficiency, there is a difference in mean rank (24.48) in literal proficiency between the native and heritage speakers in favor of the native learner type. While the test statistics for oral proficiency determine that there is no difference in means for oral proficiency between heritage and native speakers, there is a significant difference in mean rank of literal proficiency between the native and heritage learners (see Table 2.8).

Test statistics for the Mann-Whitney U test show that $p < 0.05$ (see Table 2.9) and that results are statistically significant ($U = 879.00$, $p = .001$). There is a statistical difference in literal proficiency (sum of reading and writing scores) between native and heritage speakers. The results of the Mann-Whitney U test indicate a failure to accept the null hypothesis. Therefore, the alternative hypothesis is accepted. There is a difference in means for literal proficiency between heritage and native speakers who speak a LOTE.

Table 2.9

Test Statistics of Mann-Whitney U Test for Literal Proficiency

Statistics	Literal Proficiency
Mann-Whitney U	879.00
Wilcoxon W	4884.00
Z	-3.471
Asymptotic Significance (2- tailed)	.001

The results of this needs assessment reveal that the labeling of an individual as a native and heritage speaker do not guarantee proficiency levels. There is no statistical difference in means between the heritage and native speaker in oral proficiency levels. Since this study defines the native speaker by age of onset in the second language (i.e., English) greater or equal to 12 years of age, these results suggest that age is not the only factor related to oral proficiency levels. The results of this needs assessment conclude that there is a statistical difference in learner type for literal and composite (oral plus literal) proficiency. Given the amount of time that a native speaker potentially spent in the formal education system of the native country prior to the age of 12, the demonstration of higher literal (reading and writing) skills compared to the heritage speaker is reasonable.

Constraints and Implications

This needs assessment aimed to determine whether or not there are statistical differences in language abilities between learner types using the ACTFL proficiency framework. The findings of this research analysis contribute to the greater body of research on proficiency and learner types, but in a distinct manner. Previous studies focus on learner type using other measures of proficiency, such as grammar (Kondo-Brown, 2005; White & Genesee, 1996), translation (Jia & Aaronson, 2003), isolated reading and listening comprehension tasks (Kondo-Brown, 2005), pronunciation (Yeni-Komshian et al., 2000), or generational language attrition (Kondo-Brown, 2005; Parameshwaran, 2014; Yeni-Komshian et al., 2000). Inspired by the study conducted by Parameshwaran (2014), which distinguishes oral and literal proficiency, this needs assessment also considered the two measures of proficiency as different dependent variables.

A limitation of this dataset is the underrepresentation of languages. Due to the three filters in the dataset (completion of the STAMP 4S proficiency exam, achievement of four credits, and learner type as heritage or native), the only languages that are represented with five or more participants in the sample are Spanish (n = 59), Korean (n = 59), and Mandarin Simplified (n = 5). There are other languages included in the sample that have a minimal sample size: Polish (n = 1), Arabic (n = 1), and Japanese (n = 2). Another limitation in the data is the unknown variable of gender. Biographical information about gender was not collected as part of the dataset. Finally, there is incongruence in the sample size for heritage (n = 89) versus native (n = 33) learner types. Thus, heritage speakers (73 %) comprise more than double the percentage of native speakers (27 %). A larger sample size that represents a more even split

between heritage and native speakers with equal representation of gender in a variety of languages may result in a different outcome.

Conclusion

The results of the needs assessment data analysis contribute to the current literature that examines the trends in proficiency for heritage and native speakers. The results indicate that there is a statistical difference between native and heritage speakers in composite and literal proficiency. This is understandable, given that the native speaker is described as a student with an AOA ≥ 12 to the U.S. implies previous formal education in the country of origin in which the target language is spoken. However, it is notable that there is no statistical difference in oral proficiency between heritage and native speakers. This begs the question: what external factors such as quantity and quality (or context) of language exposure for acquisition and maintenance are associated with the heritage and native speaker proficiency levels?

Köpke and Schmid (2004) stress the need for studies that consider extralinguistic factors such as frequency, amount, and settings of language use. Therefore, the following chapter presents a literature review of factors leading to advanced proficiency, such as language exposure and various contexts of language learning. Thereafter, the need to examine quantity and contexts of language use in acquiring advanced levels of proficiency warrants a more in-depth examination. Thus, the researcher conducted further study of the amount of language exposure (quantity) and contexts (quality) of language use over time between heritage and native speakers of Advanced proficiency levels. Such awareness supports language programming that guides individuals on the trajectory toward high levels of communicative competence. The lack of world language courses and teachers across elementary and secondary levels in the U.S. impacts the opportunities that develop world language proficiency for students.

Chapter 3: Theoretical Framework and Literature Review of Key Factors of Advanced Proficiency

The shortage of individuals with world language capabilities in the United States drives national security threats (United States Department of Defense, 2005a, 2005b, 2018). This dilemma intensifies the urgency to produce a multilingual workforce through the world language educational pipeline in the 21st century (Malone et al., 2003; United States Department of Education, 2008). The research substantiates the need for the U.S. workforce to acquire high levels of world language proficiency to improve employability in a range of professions, enhance business opportunities, and reduce conflicts associated with language barriers (Clifford & Fischer, 1990; Robinson-Stuart & Nocon, 1996; Tochon, 2009), and strengthen national security and defense (Clifford & Fischer, 1990; U.S. Department of Defense, 2017).

The U.S. Department of State (n.d.-a) continually monitors the need to increase the number of speakers of critical need languages, which are languages necessary for national security and prosperity (see Appendix A). Due to vacillating economic, political, and international relations between the U.S. and global contexts, the list of critical need languages may vary over time (United States Department of Defense, 2005b). Thus, the low supply of individuals who can communicate at advanced levels in critical need languages remains insufficient to meet such needs (Gentile, 2019; STARTALK, n.d.; United States Department of Defense, 2005b). Given the potential that future international contexts could deem any language as critical need, it behooves the K-12 and higher education pipeline to generate diverse world language skills.

The United States Department of Defense (2005b) advises that the status of national security situated in a global context determines the needs for language expertise across regions.

The deficiency of world language skills in the federal government, deemed a "national security crisis", presses the need to "build the pipeline to a 21st century workforce" (A National Security Crisis: Foreign Language Capabilities in the Federal Government, 2012). In 2008, only 26% of high school students in the U.S. enrolled in language classes (Pufahl & Rhodes, 2011). In comparison, the median of primary and secondary students in Europe who learn a world language is 92% (Eurostat, 2019). In 2010, only a few states in the U.S. required a world language requirement for graduation, and some even allowed for substitution of courses to obtain that credit (O'Rourke et al., 2016). Only 25% of U.S. respondents in the 2006 General Social Survey indicated they could speak a language other than English very well and learned it in school or elsewhere (Smith, Marsden, & Hout, 2015).

Students in the U.S. do not gain sufficient world language skills at an Advanced Level according to the American Council on the Teaching of Foreign Languages (ACTFL) proficiency scale (2012) throughout their academic careers to communicate proficiently (Carroll, 1967; Pufahl & Rhodes, 2011; Tse, 2000; U.S. Department of Education, 2008; Welles, 2004). However, the U.S. calls for Advanced level (ACTFL, 2012b) language skills in world languages to meet the national needs of an international 21st century context (A National Security Crisis: Foreign Language Capabilities in the Federal Government, 2012; Malone et al., 2003; Robinson et al., 2006; Tochon, 2009). In addition to the need for developing linguistic skills that are critical to national well-being, languages that are not deemed critical must not be disregarded (Wible, 2009).

Expanding beyond American security and international economic interests, advocates caution against neglecting non-critical need languages which advance communities and people groups. In addition to meeting possible governmental needs, the broadened support for all

languages spoken by communities in the U.S. adds to personal, professional, and societal significance (Wible, 2009). Thus, there is value in the engagement of linguistic and cultural contexts that leads to competence in any language (Wible, 2009). Such value affirms languages that are indispensable to an individual's community independent of governmental goals. Furthermore, the fluctuating list of linguistic needs in government agencies corroborates the wisdom of preparing a workforce in a wide range of languages for potential future purposes. Such preparation requires broad support for programs in the U.S., which address the drivers leading to the shortages of individuals who speak languages other than English (LOTE) at high levels (U.S. Department of Defense, 2005a).

In considering the problem of the lack of proficiency in LOTE of American high school students, a literature review of the problem revealed many contributing causes and underlying factors. The lack of value for LOTE (Fixman, 1990; Fry & Lowell, 2003; Gándara, 2014; Rosenbusch, 2005), the lack of opportunity to learn a LOTE (Larson-Hall, 2008; Pufahl & Rhodes, 2011; Rifkin, 2005), and the quality of LOTE instruction (Bell, 2005; Chacón, 2005; Wilbur 2007) are all main drivers for the problem. Individual factors, such as cognitive and affective variables and age (Bialystok & Miller, 1999; Carroll, 1967; Hakuta et al., 2003; MacIntyre et al., 2002; Onwuegbuzie et al., 2000) also play a role in proficiency outcomes. The following empirical study summary reflects the varying levels of language proficiency levels due to the combination of such factors.

Summary of the Empirical Study of the Problem

Heritage and native speakers of LOTE possess an advantage in language abilities due to their personal experiences and prior language exposure over time (Brecht & Ingold, 2002; Jia & Aaronson, 2003; Montrul, 2005; Parameshwaran, 2014). However, the distinction of growing up

and speaking a LOTE as a first language at a young age does not guarantee language maintenance and high levels of proficiency. Monolinguals singularly exhibit native competence in their first (and only) language or L1 and receive continuous exposure to that language (Benmamoun et al., 2013). On the other hand, bilinguals, who use two (or more) languages for different purposes in their everyday lives, acquired a second language or L2 either during their childhood or adulthood (Grosjean, 1998).

A heritage speaker is a bilingual who acquired the majority language as a second language sometime during their childhood (Benmamoun et al., 2013). The majority language is the language most dominantly utilized in one's community (Benmamoun et al., 2013). For bilinguals, the L1 can erode over time in favor of the L2 when encountering acquisition of the L2 (Benmamoun et al., 2013; Montrul, 2005). Heritage speakers may acquire the L1 completely and experience language loss thereafter, or they have not fully acquired the L1 before exposure to the L2 (Benmamoun et al., 2013). Thus, for the heritage speaker, the language ability levels of the L1 vary (Grosjean, 1998). On the other hand, a native speaker who begins acquiring an L2 has not experienced language loss of their L1 (Benmamoun et al., 2013).

Because bilinguals utilize their languages in different contexts for distinct purposes, speakers rarely speak both languages equally well (Grosjean, 1998). Heritage bilingual speakers acquired their community's majority language as the L2 during childhood (Benmamoun et al., 2013). The exact age of onset (AO) or "first meaningful second language (L2) exposure" (Granena & Long, 2013, p. 311) for the bilingual heritage speaker varies. However, the beginning of schooling propels the L2 (English in the U.S.) to become the dominant language over time for the heritage speaker (Benmamoun et al., 2013). The native speaker, by definition, functions within a monolingual environment (Benmamoun et al., 2013) until the AO of

meaningful L2 exposure. For native speaker immigrants to the U.S., the AO of L2 (i.e., English) may be synonymous with the age of arrival (AOA) to the U.S. (Abrahamsson & Hyltenstam, 2009; Unsworth, 2016).

For the purposes of this study, heritage and native speakers differ in their age of onset (AO) or first consistent exposure of the L2 (Benmamoun et al., 2013). Since the majority language of this study's context is English, AO is defined in relation to the first consistent exposure to English. The age of 12 years marks the traditional lower boundary of puberty, which is traditionally considered in the literature to cap the critical period for language acquisition (Lenneberg, 1967 as cited in Singleton, 2003). Thus, this study uses the age of 12 to distinguish early versus late onset of English exposure, which is a feature of the heritage versus native speakers as described previously. Although the literature debates the notion of puberty as a limit to the critical period (Abrahamsson & Hyltenstam, 2009), previous empirical studies use the established age of 12 to separate early and late language learners (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). In accordance with those studies, the researcher of this study replicated the AO limits to identify the native and heritage speakers. Native speakers are students with AO to English exposure at an age greater than or equal to 12 years old. Heritage speakers have an AO to English at 12 years old or younger. This research aims to determine differences in proficiency between heritage and native speakers.

The researcher of this study conducted an empirical analysis of the proficiency of 122 heritage and native secondary level students who speak a LOTE in a K-12 public school district context. The researcher used biographical data of AO to categorize participant results as heritage or native learner types. Thereafter, the researcher measured the difference in means of oral proficiency (sum of listening and speaking skills), literal proficiency (sum of reading and writing

skills), and composite proficiency (sum of oral and literal) between heritage and native speakers. The results revealed that there are statistical differences in the mean composite (p = .002) and literal (p = .001) proficiency levels between heritage and native speakers. However, there is no statistical difference in means for oral proficiency (p = .074) between heritage and native speakers of a LOTE.

The results of this empirical research in this chapter determine that there is no significant relationship between learner type and differences in oral proficiency. Similar to the conclusion of previous studies, AO (age of onset) of the L2 before or after the age of 12 is not the only factor that influences proficiency levels of heritage and native learners (Bylund et al., 2012; Lenneberg, 1967 as cited in Singleton, 2003; Oyama, 1976; Seliger, 1978). Language acquisition is a complex process that remains subject to language attrition over time (Bot et al., 1985; Köpke & Schmid, 2004; Montrul, 2005). Further studies should address extralinguistic factors of frequency and quantity of language use, as well as the contexts of language use (Köpke & Schmid, 2004). Thus, a deeper examination of how speakers of a LOTE maintain and grow their language proficiency contributes to the knowledge of the extralinguistic factors that are associated with language exposure (Köpke & Schmid, 2004).

Theoretical Framework

Individuals construct meaningful experiences through authentic, relevant contexts (Richards, 2006; Vygotsky, 1986). For years, theorists debated whether language acquisition occurs because of traits that individuals possess at birth or because of environmental factors. Such views on language acquisition evolved, entertaining theories of behaviorism, cognitivism, and constructivism. Specifically, the constructivist strand of sociocultural theory (Vygotsky, 1978) describes how social interaction in cultural contexts leads to knowledge and cognition.

The following describes the traditions of thought behind language acquisition's theoretical deliberation: *nature or nurture*?

Language Acquisition by Nurture

The acceptance of language acquisition as a contextual, active process begins with Noam Chomsky (1965), who deviated from Skinnerian behaviorist tradition. Chomsky challenged B.F. Skinner's (1957) behaviorist theory, in which language resulted from external or operant conditioning. Through the mechanism of operant conditioning, Skinner attributed the conditioned or reinforced association of a behavior with a reward. Therefore, according to Skinner's behaviorist theory, language development reflected a series of rote repetition and imitation based on external factors that yielded a specific result or output (Chomsky, 1959). Chomsky (1959) critiqued Skinner's theories, stating that such an approach erroneously considered only the "inputs-output relations" (p. 27), minimizing the complexities of language.

Language Acquisition by Nature

In contrast to Skinner's theories, Chomsky (1965) claimed that individuals have an innate trait that facilitates language learning, which is a complex process. Chomsky's (1965) nativist theory acknowledged a system in the human brain for language skills. He argued that children have an innate organism that contains a set of universal grammar rules called the language acquisition device, which mediates linguistic input and output. As a native structure, the language acquisition device allows children to acquire intricate grammar and structure in similar sequences. Thus, rather than the Skinnerian theory of controlling inputs and outputs through external conditioning, Chomsky's (1965) nativist theories enable language acquisition through internal mechanisms. The acceptance of Chomsky's theories allowed perspectives beyond behavioral approaches to explain the complexities of language acquisition.

Language Acquisition by Nature Supported by Nurture

In response to nativist theories, Jerome Bruner (1974) posited that the notion of innate wiring in the human brain proved insufficient to explain language acquisition. Bruner (1974) suggested that individual psychological processing results in language acquisition. Specifically, he acknowledged that language development transpires with individual interaction dependent on context. Bruner (1985) claimed that interaction between a child and an adult must provide the social format in order for Chomsky's Language Acquisition Device to function. Such interaction provides what Bruner called the Language Acquisition Support System. While Chomsky tended to the biological capacity to acquire a language, Bruner (1985) hypothesized that such innate ability does not lead to acquisition absent the intellectual ability to interpret and navigate culture or human contexts. In other words, communication or social interaction between individuals has purpose.

Language Acquisition by Active Construction

Referring to Jean Piaget's (1997) emphasis on peer interaction for cognitive development, Bruner (1985) valued the construction of knowledge within social contexts in order to "extract meanings, assign interpretations, and infer intentions" (p. 29). Both Piaget and Bruner reflected the constructivist view which deviated from both behaviorist and cognitive theories (Cooper, 1993). Piagetian theory emphasizes the cognitive strand of constructivism, in which he contends that learning results from the active construction of meaning (Flavell, 1996; Piaget, 1997). Like Piaget, constructivist Lev Vygotsky (1978) concurred on the child's active role in learning and cognitive processing. However, Vygotsky (1978, 1986) underscored the sociocultural strand of constructivism, in which social and cultural contexts shape individual experiences and knowledge.

Sociocultural Theory

Vygotsky (1978) pioneered the notion of social interaction as a factor in cognitive development, the basis for sociocultural theory. In contrast to his predecessors, Vygotsky emphasized the importance of peer interaction in settings that represent cultural and linguistic distinctiveness (Lantolf, Thorne, & Poehner, 2015). Unlike nativists, who focused on the biological predisposition of learning, Vygotsky (1978) posited that social interaction between an individual and a "more capable peer" (p. 86) leads to learning.

Several constructs characterize sociocultural theory. The construct of semiotic mediation refers to the adoption or appropriation of a particular tool to internalize knowledge (John-Steiner & Mahn, 1996). Thus, higher mental functions, such as attention, deliberate memory, and logical thinking result from the mediated tool of languaging situated in a particular setting (Vygotsky, 1986). Language serves as a semiotic tool by which experts transfer knowledge to novices through interaction (Vygotsky, 1986). Language both symbolizes thinking and mediates an individual to another, society, and to themselves (Vygotsky, 1986). Such interaction facilitates communicative and cognitive functions to move from the social or "interpsychological" to the personal or "intrapsychological" (Vygotsky, 1978, p. 57) level.

The construct of inner speech represents development of thinking according to the sociocultural experiences of the individual (Vygotsky, 1986). Vygotsky (1978) asserted that inner speech operated as a cognitive function of self-regulation. Self-regulation consists of one's abilities to control activities and knowledge by which an individual internalizes language (Lantolf et al., 2015). Self-regulation arises after the process of other regulation whereby a more experienced or more capable peer must assist the individual in executing such activities (Lantolf et al., 2015). The transition from other regulation to self-regulation portrays a developmental

path whereby individuals ultimately demonstrate the ability to perform a cognitive task independently. Vygotsky (1978) explained that learning and developmental levels should match within range. This concept formulates the foundation for Vygotsky's zone of proximal development.

Zone of Proximal Development

In his construct of the zone of proximal development, Vygotsky (1986) represents the range of cognitive abilities of an individual with and without assistance. With the assistance of a more capable peer, an individual can do more than what he or she can do alone within the limits of his or her development. Vygtosky refers to two developmental levels. The actual developmental level is the level of an individual's independent mental abilities. However, the potential developmental level refers to the individual's abilities with assistance of others, although those abilities have not fully developed. Vygtosky (1978) defined the zone of proximal development as the distance between the actual and potential developmental levels. He contended that "what is in the zone of proximal development today will be the actual developmental level tomorrow" (p. 87).

Thus, the zone of proximal development elucidates how learning depends on development (Vygotsky, 1986). In contrast to Piaget's (1997) cognitive theories, which viewed cognitive development as a prerequisite of learning (Flavell, 1996), Vygotsky's (1978) theoretical position attested otherwise. Learning and development are not mutually exclusive processes and should not be dichotomized. Learning and development are dependent and interface with one another. Thus, learning stimulates development, and development supports learning.

Vygotsky (1978) offered the acquisition of language to examine the relationship between learning and development. He argued that language is seemingly a means for communication. However, Vygotsky (1986) viewed language as a semiotic tool that represented an internal thought process. He noted that the ability to learn a world language was dependent upon the development of an individual's first language. However, Vygotsky (1986) also observed that learning a world language supported the development of the native language. Therefore, the paradigm of world language acquisition exposes the interdependent nature of learning and development.

Zone of Proximal Development in Language Acquisition

An individual's first language supports the mediation of second language learning (Swain, Brooks, & Tocalli-Beller, 2002). Applying the principles of sociocultural theory, such language learning occurs through a process of socially mediated interaction (Dongyu, Fanyu, & Wanyi, 2013; Swain et al., 2002), which then transforms into higher cognitive functions. Social interaction supports target language or L2 development (Swain et al., 2002). Illustrative of the zone of proximal development, such social interaction with a more knowledgeable peer, especially in natural settings, provides the opportunity for speakers to move eventually toward self-regulation (Dongyu et al., 2013; Lantolf et al., 2015).

In a world language classroom, collaboration and dialogic speech mediate language acquisition (Swain et al., 2002). With regards to classroom instruction, traditional practices such as drills and exercises impede the prospect of self-regulation in the target language, since such environments lack communicative interaction (Foley, 1991). The zone of proximal development accentuates the relationship between a learner and a more capable other, further expanded to included classroom peers (Swain et al., 2002). Language develops as an individual receives

linguistic input through interaction with others or written texts (Lantolf et al., 2015). Stephen Krashen (1982) underscored the importance of input in the Input Hypothesis of second language acquisition theory.

In his theory, Krashen (1982) distinguishes the difference between language acquisition and language learning. The former refers to a natural, subconscious process of maturing language ability through meaningful interaction in the target language, a necessary component in language development. The latter refers to the conscious process of formal instruction of the language. For the purposes of this research, the terms "acquisition" and "learning" are used interchangeably, unless otherwise specified.

The Input Hypothesis claims that in order for language acquisition to occur, a learner must understand language structures slightly beyond his or her current competence (Krashen, 1982). Krashen represents this hypothesis as "$i+1$", where "i" symbolizes the learner's linguistic competence, and the "$+1$" refers to linguistic input a bit beyond the learner's current language abilities (1982). Thus, Krashen's (1982) Input Hypothesis supposes an interaction between an expert and a novice learner, for example, "caretaker speech" (p. 22) between a caretaker and a child. However, Lantolf et al. (2015) caution about equalizing the zone of proximal development and the Input Hypothesis.

The zone of proximal development focuses on the interactional relationship between the individual and the more capable peer, which ultimately leads to developmental independence through self-regulatory processes (Vygtosky, 1978). Krashen's notion of $i+1$ assumes the same increment of language with minimal differentiation in development (Lantolf et al., 2015). The zone of proximal development reflects the capabilities of an individual with or without the mediated assistance of the more capable peer. Krashen's hypothesis focuses on the increase of

linguistic understanding of the learner and a message as a measurement of development. However, Vygotsky's zone of proximal development stresses the changes in the mediation of the interaction between expert and novice that signals self-regulation (Lantolf et al., 2015).

Figure 3.1 illustrates the combination of theories that provide the perspective of this research study. The notion of language acquisition as an innate endeavor (Chomsky, 1965) coupled with the importance of social interaction (Vygotsky, 1978) emphasizes that individuals acquire language through internal processes while interfacing with others. In particular, the zone of proximal development, which is highlighted in Vygotsky's Sociocultural Theory, underscores the dynamic between an individual and a more knowledgeable other. This interaction is fostered through Krashen's Input Hypothesis (1982), which accentuates the significance of input.

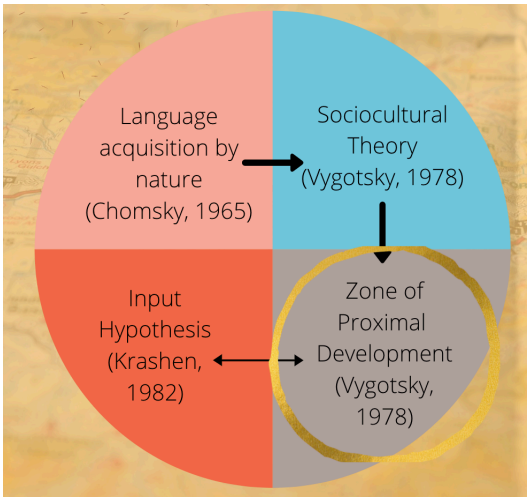

Figure 3.1. Theories Considered for Theoretical Framework

The theories of Chomsky, Vygotsky, and Krashen inform the perspective through which this research study focuses on the notion of the "more capable peer" (Vygotksy, 1978, p. 86).

Language Acquisition through a Sociocultural Framework

While input or language exposure is a crucial factor in second language acquisition (Krashen, 1982), sociocultural theory regards the cultural component of social interaction

(Vygotsky, 1978). Culture, or particular history, practices, influences of a setting, shapes cognitive development through experiences with the environment and others, physical tools, and semiotic tools such as language (Vygtosky, 1978). Thus, language acquisition is situated in the cultural context of an individual (Dongyu et al., 2013). Individuals acquire language skills through their cultural lens, which develops through interactions in their communities (Dongyu et al., 2013).

The application of sociocultural theory in language acquisition supposes that the development of linguistic competence occurs in different places and in different ways (Dongyu et al., 2013). Moreover, language acquisition varies given the differences in mediation that a learner receives and the purposes of driving the use of language (Lantolf et al., 2015). As active constructors of their own learning, social interaction, whether between peers or between a caregiver and child, remains a compelling force of language acquisition (Donato, 2000; Mitchell, Myles, & Marsden, 2013). The collaborative construction of knowledge may occur through formal language instruction or in a natural setting with members of a given culture (Mitchell et al., 2013).

Reaching high levels of language proficiency requires the construction of meaningful experiences (Von Glasersfled, 1989). Vygotsky's (1978) sociocultural theory recognizes how culture and environment shape the types of experiences and social interactions that lead to cognitive development. Thus, the outcomes of the language acquisition process depend on individual and contextual factors over a lifespan. Through this perspective, the researcher conducts a deeper examination of those factors instead of a short-term intervention.

Sociocultural theory provides the theoretical framework for this research study. The study focuses on identifying the critical factors during an individual's lifespan, such as the

quantity, quality, and contexts (type) of target language exposure that are associated with the acquisition and maintenance of a language other than English (LOTE) at advanced levels for communicative purposes. Individuals who acquire and sustain advanced levels of proficiency are enabled to carry out their academic, career, or both goals in global contexts.

Literature Review of Factors Leading to Advanced Proficiency

There is a paucity of recent studies regarding the characteristics of speakers that have supported the development of advanced world language skills according to the ACTFL framework. The literature lacks an established repertoire of studies regarding the combination of how both factors of the quantity of language exposure and contexts of language learning and maintenance in one's environment are related to the pathway that leads to advanced proficiency levels. The following section provides a literature review on such factors through the perspective of sociocultural theory.

Quantity of Language Exposure

Language exposure refers to the quantity and type of contact hours and output or use of a target language (Carroll, 1967; Malone et al., 2003; Unsworth, 2013). Such exposure entails language acquisition and language maintenance (Unsworth, 2016). World language acquisition refers to the initial attainment of another language for communicative purposes (Carroll, 1967; Malone et al., 2003; Unsworth, 2013). Additionally, world language maintenance refers to the continued consistent exposure of the target language to sustain communicative skills (Carroll, 1967; Malone et al., 2003; O'Rourke et al., 2016; Pufahl & Rhodes, 2011). This study examines the acquisition and maintenance of languages other than English (LOTE), which persists as a pressing need in the U.S. (Malone et al., 2003). Language exposure is nuanced for heritage and native speakers due to the onset of an L2 at an earlier versus later age (Montrul, 2008).

Language exposure of heritage and native speakers. Target language exposure or quantity of contact hours vary for each context and learner type. For example, the native speaker gains years of first language (or L1) exposure from childhood to the present age (Benmamoun et al., 2013). Likewise, the heritage speaker also gains years of L1 exposure due to some form of continued use of the language in the home (Benmamoun et al., 2013; Montrul, 2008). The language "acquisition" that occurs in the home is what Krashen (1982) distinguishes from language "learning". The development of the home language reflects Krashen's (1982) description of the natural, meaningful interaction in which interaction between an expert (family member) and a novice learner (child) continually takes place. The perspective of sociocultural theory views the active construction of language development in a home setting as a mediated social interaction among family members (Donato, 2000; Lantolf et al., 2015; Vygotsky, 1978).

Sociocultural theory regards culture and the environment as forces that drive social interactions and experiences (Vygotsky, 1978). For bilingual speakers residing in the L2 or English majority environment, the age of onset naturally becomes a strong consideration in monitoring both L1 and L2 development (Montrul, 2008). As explored in this study, the native speaker has a later age of onset (AO ≥ 12) of the L2 (i.e., English), whereas the heritage speaker has an earlier age of onset (AO < 12) of the L2 (i.e., English). Consequently, the group of heritage speakers in this study received increasingly more quantity of L2 exposure at an earlier age. In a similar vein, the native speaker group had more time to develop completely their L1 language skills as their dominant language before the introduction of an L2. The introduction of the native speaker to the L2 majority language environment signifies what Bylund (2009) refers to as the "age of reduced L1 contact" (p. 307). In accordance with these distinctions, the results

of the needs assessment corroborate the notion that the native speaker group demonstrates a statistically higher mean literal (sum of reading and writing) proficiency (p = .001).

Language exposure and proficiency. Studies in the literature operationalize the quantity of target language exposure as the difference between the individual's age at present and the age of onset (Abrahamsson & Hyltenstam, 2009; Unsworth, 2016). How much continued target language exposure of the L1 suffices to reach and maintain advanced levels of proficiency in the L1? In general, the suggestion that higher language exposure leads to higher proficiency levels frequently appears in the literature (Carroll, 1967; Davidson, 2007; Larson-Hall, 2008; Rifkin, 2005; Segalowitz et al., 2004; Shedivy, 2004). However, from a sociocultural perspective, language exposure does not necessarily equate to self-regulation and independent uptake of language.

The sole quantity of L1 language exposure is a factor, but it does not suffice to determine L1 proficiency outcomes. For example, Birdsong (1999) found that less language exposure does not preclude the attainment of higher proficiency levels. Individuals with an older age of onset for language learning can also demonstrate native-like competency (Birdsong, 1999). As another point, native learners (n = 33) in the present study have comparable quantities of L1 exposure. The participants, who are current middle or high school students, have a similar childhood age of onset of L1 as a first home language. Nonetheless, the data of the native students exhibit varying degrees of L1 proficiency. For example, ranges of speaking proficiency, which does not necessarily rely on formal schooling to acquire (Yeni-Komshian et al., 2000), for native speakers spanned from "4" or "Intermediate-Low" to "8" or "Advanced-Mid" skills. Thus, the needs assessment data show that the quantity of L1 language exposure is not the only factor to determine L1 competency (Benmamoun et al., 2013). Considering these data points through a

sociocultural perspective, the interactional and environmental experiences of those native speakers differed in the degrees to which the language learning process occurred. Likewise, heritage learners (n = 89) who, by definition, acquired an L2, often at the expense of the L1 (Benmamoun et al., 2013), also showed similar speaking proficiency skills, ranging from "3" or "Novice-High" to "8" or "Advanced-Mid" competency. Given the broad ranges of L1 proficiency data for heritage and native bilinguals, the relationship between the L1 and L2 is also essential (Montrul, 2008).

Effects of L2 on L1

The degree of acquisition and maintenance of a first language is subject to the dominance of the majority language as the L2 (Benmamoun et al., 2013; Montrul, 2008). In other words, for bilinguals, the age of onset (AO) of L1 is not the only index of language exposure that determines linguistic competency. The consideration of AO as a sole factor recaps the strength of Vygotsky's (1978) zone of proximal development compared to Krashen's (1982) Input Hypothesis. The singular focus on AO of L1 to predict L1 proficiency assumes that individuals improve in language competency through similar linguistic increments over time, reminiscent of Krashen's (1982) "i+1" hypothesis. Rather, an important factor for L1 competency in bilinguals is explored as a function of when the second language is acquired and if and how the L2 affects the L1 due to reduced L1 contact (Benmamoun et al., 2013; DeKeyser, 2000; Montrul, 2008). Vygotsky's (1978) zone of proximal development illustrates the developmental path that leads to cognitive independence through the social interactions of a "more capable peer" (p. 86). Hence, the personal language history of L1 and L2 use, such as type continued language exposure, frequency, contexts, all play a role (Montrul, 2008) in the

types of sociocultural interactions that frame language acquisition, maintenance, or attrition of the L1 and L2.

Studies that focus on the effects of L1 productive competency after the onset of the L2 are sparse in the literature (Ahn, Chang, DeKeyser, & Lee-Ellis, 2017). Moreover, the handful of studies that specifically examine the age effects on L1 production were conducted recently within the last couple of decades (Ahn et al., 2017). Out of those few studies, two focus on a subset of participants that are less representative of the greater population of bilinguals (Ahn et al., 2017). For example, Montrul (2011) investigated the age effect on L1 attrition on adopted bilinguals. Adopted international bilinguals have significantly reduced contact to the L1 due to their new environment, which in many cases uses a different language (Montrul, 2011).

Montrul (2011) conducted a case study of a 34-year-old Guatemalan adoptee who immigrated to the U.S. with the AO to English of nine years old. Thus, active construction of language focuses on the new L2 (English) rather than the maintenance of the L1. In other words, the application of Vygotsky's (1978) theory holds that the interaction with a more capable peer in the L1 is drastically reduced. However, in this case, on oral, reading, and written tasks in Spanish (L1), the adopted individual demonstrated some ability to produce orally, comprehend, and to converse to some extent (Montrul, 2011). To reiterate, the participant did not undergo complete language attrition in the L1 despite the overt reduction of L1 interaction. Through further examination of L1 history, Montrul (2011) attributes prior schooling in L1 up to the age of nine as both an explanation of literacy and as an impediment to full L1 language attrition. In line with sociocultural theory, the contextual factors of how and to what extent the adoptee acquired the L1 matters. Comparatively, the participant demonstrated native level abilities in English (L2) (Montrul, 2011).

In another study by Oh, Jun, Knightly, and Au (2003), the authors compared 12 monolingual English-speaking, but ethnically Korean adults, who immigrated to the U.S. as young adoptees to 13 novice non-Korean learners of the Korean language in phoneme identification tasks. The adoptees were adopted between the ages of one and three years old. All participants attended a first-semester Korean class at the time of the study. In this case, the adoptees had access to L1 learning. Their participation in the Korean class even as adults signifies continued social interaction between novice learners with a more capable peer (i.e., the instructor), which can eventually lead to independence depending on their self-regulatory processes (Vygotsky, 1978).

The results of the study revealed that the Korean adoptees outperformed the novice learner group on some phoneme tasks, but not all (Oh et al., 2003). As in the study conducted by Montrul (2011), these results validated that the participants did not experience complete L1 language attrition despite drastically reduced L1 exposure. Adoptees have reduced access to their mother tongue compared to bilingual heritage speakers who may have continued exposure to their family's native language (Montrul 2011; Oh et al., 2003). Although Montrul (2011) and Oh et al. (2003) contribute to the literature on age effects of L1 attrition, the target participant groups focused on international adoptees instead of a general bilingual population. Hence, an examination of the literature on the broad spectrum of heritage and native bilinguals yields three studies (Ahn et al., 2017; Bylund, 2009; Yeni-Komshian et al., 2000) that purposely concentrate on the L2 age effects on L1.

Age of onset to index L2 learning in participants. As a common thread, each of these investigations emphasized the construct of the age of onset (AO) as an index for the moment in which L2 learning initiated. Specifically, Ahn et al. (2017) used the AO of the L2 to explore L1

attrition, whereas Bylund (2009) and Yemi-Komshian et al. (2000) used the AO of the L2 to examine the age effects on the L1 and/or L2. Likewise, the researcher of the current study in question employed AO to discriminate between the native (AO of L2 ≥ 12) and heritage (AO of L2 < 12) speaker learner types.

Although these three studies (Ahn et al., 2017; Bylund, 2009; Yeni-Komshian et al., 2000) used AO to indicate the introduction of the L2, the participants in the studies differed in their ranges of AO. Ahn et al. (2017) examined 21 Korean bilinguals (L1/Korean, L2/English) who immigrated to the U.S. from the Republic of Korea. The study uncovered the age effects in L1 attrition on language perception. The participants self-reported linguistic dominance in L2 competency. Ahn et al. (2017) reportedly focused on early bilinguals, but the AO of the L2 ranged from three to 15 years of age. One inconsistency in the selection of participants is that based on their literature review, the authors recognize the hinge point of 12 years old as a marker of early versus late bilingual. It is unclear why the participants with an AO 12 years old constitute subjects in the study. Furthermore, the intended exclusion of late bilinguals in the study insinuates that L1 attrition does not occur in late bilinguals. In addition, most of the participants attended formal schooling in Korea for varying lengths of time (M = 22 months), which confounds the age effect.

The focus of Bylund's (2009) study determined if AO of L2 affects the acquisition and maintenance of L1 conceptualization patterns in goal-oriented motion events of L1 Spanish/ L2 Swedish bilinguals residing in an L2 context compared to monolingual patterns of conceptualization. Similar to the participants in the study by Ahn et al. (2017), the participants are bilinguals who display native competency in the L2 and reside in the L2 environment. Participants of Bylund's (2009) study are 31 Spanish (L1)/ Swedish (L2) bilinguals living in

Sweden. Similar to Ahn et al.'s study (2017), Bylund's (2009) participants have an AO of the L2 that range from one year to 19 years of age. All participants are perceived as native speakers of Swedish per native listener judges. Since the participants are pre-identified as native-like in Swedish (L2), the proficiency level of the L2 is held constant. Moreover, the participants self-reported at least functional levels of Spanish (L1) competency. This feature is slightly different from Ahn et al.'s (2017) participants, who prefer to speak the L2, yet their L2 competency is unknown. Additionally, Bylund (2009) does not report on the schooling history of the L1 prior to L2 onset, which proved to be a significant factor in Montrul's (2011) study in which prior formal education explained L1 retention despite a substantial reduction of L1 contact.

The Yeni-Komshian et al. (2000) study explores speech production (pronunciation) in both the L1 and L2. A strength of this study is the robust quantity of participants. Two-hundred forty Korean (L1)/English (L2) bilinguals residing in the U.S. with varying L2 AO (between one and 23 years of age) serve as this study's participants. Yeni-Komshian et al.'s (2000) work is reportedly the largest published study that explores speech production (pronunciation) in both the L1 and L2 (Ahn et al., 2017). Half of the participants in this study (Yeni-Komshian et al., 2000) arrived at the U.S. before the age of 12, and the other half arrived after the age of 12. Hence, the participants represent the dynamics of early (AO of L2 < 12) and late (AO of L2 ≥ 12) bilinguals equally. Specifically, the authors of this study stratify the participants by AO of L2 into ten bands of age of onset (Yeni-Komshian et al., 2000). Comparatively, in the research study of this paper, the AO of L2 determines early or heritage (AO of L2 < 12) versus late or native AO of L2 ≥ 12) speaker learner types, albeit not represented equally (heritage, $n = 89$; native, $n = 33$). In the study conducted by Yeni-Komshian et al. (2000), such balance and further AO stratification substantiate the conclusions drawn related to age effects using specific comparative groups,

which is an aim of their investigation. In order to control for varying degrees of bilingualism, the participants qualified for Yeni-Komshian et al.'s (2000) study through the successful completion of a sentence production test in both Korean and English judged by the native speakers. The authors appraise the test at a fourth-grade level. It is unclear why a test written specifically at a fourth grade versus another level served as a filter for bilingual participants. A fourth-grade level of production in either language assumes at least four to five years of academic schooling through which language is seemingly solidified to a near-native level of fluency (Krashen & Terrell, 1983).

Language competence. The three studies (Ahn et al., 2017; Bylund, 2009; Yeni-Komshian et al., 2000) described above draw conclusions about language competency in similar ways. All three studies use native controls to judge how the participants fare in comparison. Ahn et al. (2017) use 17 monolingual native speaking control participants who reside in South Korea to compare how the bilingual participants residing in the U.S. perform on specific phonological contrasts. The results hold that the bilingual participants' accuracy in L1 correlated with the AO of L2. Thus, Ahn et al. (2017) conclude that early learners of English (L2) are less likely to perceive L1 sounds accurately in comparison to their native language counterparts. In addition, the age of 12 of L2 AO marks the point of difference between L1 perceptual attrition and nativelike maintenance of L1 perception (Ahn et al., 2017).

Like Ahn et al. (2017), Bylund (2009) also used a control group of 15 native Spanish speakers to serve as a monolingual point of L1 comparison for the Spanish/Swedish bilingual participants. Bylund (2009) measured grammatical and lexical proficiency through conceptualization patterns as an indicator of language competency. The results of the study reveal that the conceptualization patterns of participants with AO of L2 12 mimicked those of

monolingual native Spanish counterparts. Therefore, Bylund's (2009) study suggests that the AO does affect event conceptualization patterns in favor of late over early onset of L2.

In the study by Yeni-Komshian et al. (2000), Korean (L1) and English (L2) monolingual speakers serve as native speaker raters of both languages. The results of the study demonstrate that the bilingual individuals who maintained the L1 to the degree of a native speaker in pronunciation acquired the L2 after the age of twelve. Individuals with an AO of L2 prior to five years old evidenced native-like pronunciation of English (L2), but a foreign accent in Korean (L1). Participants with an AO of 12-23 years of age demonstrated Korean (L1) pronunciation like monolingual native Koreans. The study by Yeni-Komshian et al., (2000) determined that sound L1 exposure through the age of 12 establishes a path for L1 maintenance at a nativelike level measured by pronunciation tests.

L1 history of participants. An important distinction in drawing conclusions about the age effects of the L2 on the L1 is the extent to which participants maintain the first language. The application of sociocultural theory to first language maintenance reiterates that continued development of a language unfolds in a variety of cultural and social interactions (Vygotsky, 1978). Since one actively constructs his or her own language learning (Donato, 2000; Mitchell et al., 2013; Von Glasersfled, 1989), the individual's L1 history is fundamental to understanding the effect of the L2 on the L1. For example, in Bylund's (2009) study, conceptualization patterns of participants with a later AO of L2 reflected similarities with their native Spanish counterparts. However, does the comparison to a native speaker determine if attrition occurs? Without the clear history of the participants' L1 development, it is uncertain if the first language underwent attrition as opposed to the L1 was not even fully developed. The absence of participant L1 history in Bylund's (2009) ensues as a weakness in the study's conclusive efforts

since the determination of age effects of L2 on the L1 or language history factors of the L1 is blurred.

In contrast to Bylund's (2009) study, which lacked L1 history, Yeni-Komshian et al. (2000) conducted interviews with their participants regarding their schooling and language experiences in the L1 and L2. Using this information, the authors concluded that the number of years of schooling in L2 English and the amount of English use positively affected performance on grammatical judgment tasks. Similar to the study by Yeni-Komshian et al. (2000), Ahn et al. (2017) employed a language history questionnaire authored by Lee-Ellis (2012) to ascertain what L1 maintenance consisted for the participants. The questionnaire included questions regarding the context of first language acquisition, the percent of time and use of language, the time and type of language exposure over time specified by age bands, and with whom communication in the L1 occurred (Lee-Ellis, 2012). Such factors describe types of sociocultural settings and experiences that lead to the construction of L1 knowledge and acquisition (Donato, 2000; Mitchell et al., 2013; Vygotsky, 1978). The knowledge of such factors strengthened the study's conclusion since the authors (Ahn et al., 2017; Yeni-Komshian et al., 2000) controlled for significant language history variables, such as L1 proficiency and language use prior to the reduction of L1 contact hours due to the onset of the L2.

Contexts (Type) of Language Learning and Implications for Proficiency

As illustrated in the research designs of Ahn et al. (2017) and Yeni-Komshian et al. (2000), sociocultural contexts of L1 acquisition and maintenance play an important role in understanding how such factors lead to language proficiency outcomes. Accordingly, neither age of onset in isolation, nor absolute quantity of target language exposure solely determine language competency levels (Unsworth, 2016). In his Input Hypothesis, Krashen (1982)

emphasized input or language exposure as a determining factor in language acquisition. Whereas quantity of language exposure persists as a factor in language acquisition, as described in the previous section, Vygotsky's (1978) sociocultural perspective stresses socially mediated interactions that eventually lead to self-regulation processes of language acquisition.

Such sociocultural experiences lead to the active construction of meaningful experiences in relevant contexts (Vygotsky, 1978, 1986). Therefore, the sociocultural lens assesses the environment in which an individual acquires and maintains language, and how one's environment supports self-regulatory processes that precede linguistic independence (Vygotsky, 1986). As reflected in the studies described previously, the contexts or quality of previous language exposure bears value on language proficiency (Unsworth, 2016). The following sections explain the significance of commonly studied contexts of language acquisition in the literature.

Home. As discussed under the section of "Quantity of Language Exposure", native speakers learn the target language in the context of home and surrounding environment until the onset of meaningful L2 exposure at or after the age of 12 (Benmamoun et al., 2013). Heritage speakers also learn the language at home but experience meaningful L2 exposure before the age of 12 (Benmamoun et al., 2013). Children who experience growing up with more than one language must divide their time between those languages (Valdés, 2001). In such a dynamic, children receive less language exposure than their monolingual peers in each respective target language, assuming similar relative interaction with language models (Unsworth, 2016; Valdés, 2001). Thus, when comparing the same absolute length of time of language exposure between a heritage speaker and a monolingual speaker, the actual quantity of language varies (Unsworth, 2013; Unsworth, 2016; Valdés, 2001). Thus, the details of language exposure must also be taken

into consideration because the quality of contact hours can vary even within those similar contexts of language acquisition (Unsworth, 2016). Examining such contexts to understand one's cognitive development is the foundation of Vygotsky's sociocultural theory.

Learning contexts must be purposeful to the individual for acquisition to occur (Lantolf et al., 2015). Social interaction within the home and surrounding personal environments supports language development (Swain et al., 2002). In line with the zone of proximal development in sociocultural theory, social interaction with more knowledgeable others (Vygotsky, 1978) fosters settings whereby learners move toward self-regulation (Dongyu et al., 2013; Lantolf et al., 2015). Because the quantity and quality of language interactions in the home are broad within the bilingual construct, the categorization of heritage and native learner types in this current research study represent the common effects that an earlier or later onset of L2 has on L1 proficiency levels. One factor of earlier and later onsets of L2 that impacts L1 proficiency is formal schooling (Benmamoun et al., 2013). Heritage speakers may or may not have had formal schooling in the target language, depending on if their age of onset (AO) of L2 falls within the school age range (Benmamoun et al., 2013). The following section describes the formal school context of language acquisition.

Formal school. The types of world language programs across the nation vary. From the perspective of a bilingual English/LOTE speaker, several programs serve to maintain the L1. Many states offer elementary immersion or dual language programs, in which the target language and English serve as means to learn academic content (Sparks, Luebbers, & Castañeda, 2017). Other programs offer single courses specifically designed for heritage speakers (Brecht & Ingold, 2002). Traditional world language courses, which teach the target language for one class period during the school day, usually begin at secondary levels (Pufahl & Rhodes, 2011). In

addition, some heritage and native speakers attend heritage language school or similar community-based classes that focus on the maintenance of the native tongue (Brecht & Ingold, 2002).

The common thread in the different types of school settings mentioned above is the presence of language models in an academic setting. The purpose of the language use contrasts with the daily social interactions of a home environment to meet personal needs. Viewing the social and academic settings through a sociocultural perspective highlights the differences in the two environments. In his sociocultural theory, Vygotsky (1978) asserted the stimulus of social interaction and context in cognitive development. In the case of academic settings, language learning results from social interactions with "more capable peers" (Vygotsky, 1978, p. 86), a role which unquestionably distinguishes teachers in the paradigm of school. Fellow students may also fulfill this role of supporting a colleague through the cognitive path of Vygotsky's (1986) zone of proximal development. In these interactions, students inherit cultural tools from the more knowledgeable other, which include history, practices, values, influences, semiotic tools, such as language, and even technological tools (Vygotsky, 1978). Such culture in an academic setting is distinct from the cultural tools acquired in a home environment. Thus, language acquisition and competency are a function of the cultural context of an individual (Dongyu et al., 2013).

Immersion programs in school offer high amounts of contact hours from language models or more knowledgeable others (Vygotsky, 1978). Immersion programs offer partial and full portions of the school day conducted exclusively in the target language (Pufahl & Rhodes, 2011). These programs differ from conventional language classes and vary in amounts of target language use (Pufahl & Rhodes, 2011). Traditional approaches in such language classes up to

the 1960s focused on grammatical competence through repetitive exercises as a basis for learning language (Richards, 2006). While current trends in language teaching focus on communication and meaningful use of the language, however, traces of the traditional grammatical approach persist throughout current world language classrooms (Richards, 2006). The communicative approach to language instruction uses the target language more extensively than grammatically based classrooms (Richards, 2006).

The results drawn from empirical studies show that the immersion classroom can yield higher proficiency levels than a traditional classroom setting that uses immersive instruction (Rifkin, 2005; Xu, Padilla, & Silva, 2015). In a study, Xu et al. (2015) compared the performance of elementary immersion and traditional, immersive-type high school courses after the same number of years of participation in each type of program. The participants in the study were fourth and fifth grade Mandarin elementary immersion students and traditional high school Level 4 and 5 Mandarin classes in the same school district. The fourth-grade students (n = 18) included half Chinese heritage and half non-heritage learners. The fifth-grade students (n = 30) included 11 Chinese heritage and 19 non-heritage learners. The Level 4 (four years of Mandarin study) and Level 5 (five years of Mandarin study) high school participant groups included 52 and 19 Chinese heritage learners, respectively. Students from both high school groups took the Standards-Based Measurement of Proficiency (STAMP) 4S assessment, while the elementary group took the elementary STAMP version, which includes comparable age-appropriate tasks (Xu et al., 2015). The results indicate that compared to the high school groups, the elementary immersion student groups demonstrated comparable medians in reading, writing, and speaking performance (Xu et al., 2015). Particularly, a comparison of the Level 5 high school and elementary groups reveals that the fifth-year immersion students (mostly non-heritage speakers)

outperformed their high school (mostly heritage speakers) counterparts in reading skills (Xu et al., 2015). Descriptive analysis demonstrates that 66% of the fifth-grade students achieved at the Intermediate reading performance level compared to 59% of the fifth-year high school students (Xu et al., 2015). Furthermore, no fifth-year high school student scored at the Intermediate-High sublevel, whereas 23% of the fifth-grade students demonstrated proficiency at that level (Xu et al., 2015).

Similar to the findings by Xu et al. (2015), a study by Rifkin (2005) also concluded favorable proficiency gains through an immersive instructional environment. Rifkin (2005) examined the proficiency gains of 352 majority native English college students after three summers of a nine-week immersion program in Russian. After 450 hours of Russian instruction, participants demonstrated an Intermediate-Mid level in listening and reading (Rifkin, 2005). In writing and speaking, participants achieved an Intermediate-Mid to Intermediate-High level. Students with more than 600 hours showed Intermediate-High levels in listening and reading and Advanced Low in speaking and writing (Rifkin, 2005). These results are consistent with other studies regarding proficiency levels and hours of classroom instruction, in which higher quantities of classroom instruction results in higher levels of proficiency (Alarcón, 2010; Carroll, 1967; Xu et al., 2015). Accordingly, the conclusions of both Xu et al. (2015) and Rifkin (2005) support the notion that the cultural settings influence purpose leading to interactions that prompt cognitive development (Vygotsky, 1978). As exemplified in both the studies of Xu et al. (2015) and Rifkin (2005), language proficiency outcomes vary depending on the mediation that a learner receives and the purpose of language use (Lantolf et al., 2015). The driving purpose of language embodied in both settings of Xu et al. (2015) and Rifkin (2005) is formal, immersive instruction mediated by a teacher language models. Juxtaposed to an immersive classroom

setting, language acquisition also occurs in target language community (Jochum, 2014; Segalowitz et al., 2004).

Study abroad. A study abroad environment offers a more naturalistic culture for developing language (Mitchell et al., 2013). John Carroll's (1967) study has endured as a seminal piece of research in the area of world language proficiency. The large sample size in Carroll's (1967) study boasts a strength in comparison to the smaller sample sizes in the studies conducted by Xu et al. (2015) and Rifkin (2005). Over 2700 college seniors majoring in five different modern languages at over 200 institutions nation-wide were measured in their listening, speaking, reading, and writing skills using a combination of the MLA Proficiency Test and a questionnaire regarding personal language history and motivations (Carroll, 1967).

Descriptive analysis of mean proficiency test scores reveals that the group of participants who studied abroad outperformed the group of participants who had never studied abroad (Carroll, 1967, p. 138) in every skill (listening, speaking, reading and writing) and every language (German, French, Russian, and Spanish). In addition, a clear trend emerges in the data that reflect a positive relationship between the amount of time spent abroad (summer or full year) and the mean proficiency test score in all four language skills of every language in the study (Carroll, 1967, p. 138). Even students with low language aptitudes who studied abroad demonstrated stronger speaking and listening competence than their counterparts who did not study abroad (Carroll, 1967). Thus, the findings suggest a robust correlation between even short doses of study abroad and its positive effect on student proficiency levels (Carroll, 1967). The results also demonstrate that individuals with home language experience in the target language, as well as earlier exposure to the language, reflect greater linguistic competence (Carroll, 1967).

More recent literature builds on Carroll's (1967) conclusion about the benefits of a study abroad environment on proficiency levels (Davidson, 2007; Hernández, 2010; Jochum, 2014; Segalowitz et al., 2004). As an influential piece of research, Carroll's study (1967) emphasizes the imperative nature of rich target language exposure and opportunities for sustained contact hours that characterize the study abroad context. As such, the studies by Xu et al. (2015), Rifkin (2005), and Carroll (1967) reflect the significance of different cultures on language acquisition per sociocultural theory-- formal instructional and naturalistic contexts. The practices and influences of each type of context situate the language acquisition of the learner by prompting a distinct type of social interaction (Dongyu et al., 2013; Mitchell et al. 2013) with a more capable peer (Vygotsky, 1978, p. 86).

Research Study

Past studies reveal that multiple factors contribute to the maintenance and acquisition of a language. For example, Carroll (1967) examined "student factors" (p. 101) such as sex, age, motivations, interests, study abroad, and time of language onset as factors in the achievement of world language skills. Yeni-Komshian et al. (2000) sought L1 history of the participants to understand the context of first language acquisition, the percent of time and use of language per age band. The age at which bilinguals acquired the L1 serves as only one factor related to language proficiency (Bylund, 2009). Individuals acquire the L2 at different times and through different contexts of learning. Bylund (2009) cautions about suggesting that L1 attrition is induced by acquiring an L2. Building on these past studies, this research study seeks to understand at what point and under what conditions does the L2 affect the maintenance of L1.

The purpose of this research study is to examine the quantity, quality, and contexts of world language exposure with proficiency levels across the following learner types: heritage (H)

and native (N) learner types or speakers. To further examine the nuances of the quantity quality, and contexts of language acquisition and maintenance over time between learner types, the researcher employed a quantitative analysis of existing data in her school district. The existing data include scores from a proficiency test and responses from two different language background questionnaires. The questionnaires include biographical questions related to the quantity and type of target language exposure. The researcher conducted a quantitative study to determine the description of LOTE exposure and use in different contexts, as well as the correlation of such factors to proficiency levels. The descriptive and correlational analyses support the understanding of what patterns emerge related to the contexts, amount, and quality of target language use.

Conclusion

Since the language acquisition process constitutes a contextual and social process (Donato, 2000; Mitchell et al., 2013; Vygotsky, 1978), the number of contact hours with a LOTE is not the only factor to consider. While a few studies reveal the importance of sufficient hours of contact hours in a LOTE (Carroll, 1967; Rifkin, 2005; Xu et al., 2015), the context of meaningful experiences also plays a role in learning (Dongyu et al., 2013; Lantolf et al., 2015). The literature needs an established repertoire of studies regarding the combination of how all three factors of quantity and quality of language exposure and contexts of language use shape the pathway that leads to advanced proficiency levels in one's environment (Alarcón, 2010; Köpke & Schmid, 2004; Moeller, 2013; Pearson et al., 2006; Samimy, 2008). The recent body of current literature primarily concentrates on proficiency outcomes in comparing the learner types (Jia & Aaronson, 2003; Kondo-Brown, 2005; Yeni-Komshian et al., 2000) or language attrition of heritage and native speakers (Parameshwaran, 2014). However, these studies do not seek to

measure the language experiences (quantity, quality, and contexts) over time for language learner types.

By gaining insight into the type of language exposure across learner types, individuals, practitioners, and organizations can create similar language exposure and cultural opportunities that characterize the paths to advanced proficiency levels. High levels of proficiency in all languages are needed to meet the political, social, economic, and security needs of the U.S. (United States Department of Defense, 2005a, 2005b, 2018; United States Department of Education, 2008). The demands for skills in specific languages vary according to the political, economic, and international relations landscape (U.S. Department of Defense, 2005a; Wible, 2009). This study will help fill this gap in the literature and uncover factors that may be encouraged and sustained through effective K-12 world language programming. The knowledge gained through this research will champion the necessity of world language proficiency skills and will make palpable the image of a multilingual nation.

Chapter 4: Methodology

For years, local and national stakeholders urged the need for increased multilingual skills and cultural awareness in the United States (U.S.) through the K-12 pipeline (Pufahl & Rhodes, 2011; U.S. Department of Education, 2008). The U.S. needs advanced level speakers to meet national and international intelligence, security, economic, and diplomatic needs (U.S. Department of Education, 2008; Malone et al., 2003). Students in world language instruction tracks in K-12 schools in the U.S. do not reach advanced LOTE skills throughout their academic careers to communicate proficiently in an increasingly global 21st century community (Pufahl & Rhodes, 2011; Tochon, 2009). Key factors related to the problem include the amount of exposure or the number of contact hours inside or outside the home (Carroll, 1967; Davidson, 2007). The following offers a brief summary of the theories that serve as a foundation for the previously conducted needs assessment and methods for further study.

Summary of Theoretical Framework

As described in the previous chapters, sociocultural theory (Vygotsky, 1978) coupled with the evolution of key language acquisition theories (Chomsky, 1957, 1965; Bruner, 1974; Krashen, 1982) serve as the theoretical framework for this study. Chomsky (1957) challenged the behaviorist notion that language acquisition is a result of repetition and imitation based on external stimuli. Chomsky's (1965) nativist theories recognize the complexities of language acquisition thereby underscoring the innate human abilities which mediate linguistic input and output. The recognition of the individual as an agent in learning foreshadows the posthumously translated work of Vygotsky's (1978) sociocultural theory, which considers individuals as active constructors of their own learning.

Sociocultural theory lays the groundwork for social interaction as a major factor in learning (Vygotsky, 1978). In addition to Vygotsky's work and in response to Chomsky's emphasis on human capacity, Bruner (1985) coupled the notion of interaction situated in social contexts. In other words, an individual's innate ability alone is insufficient to explain language acquisition. Bruner stressed language acquisition as a result of social interactions. This idea reflects Vygotsky's (1978) emphasis on the interaction between a "more capable peer" and an individual, which serves as a pathway for language acquisition due to the language modeling of a more skilled speaker to a learner. Krashen's (1982) Input Hypothesis also represents the same dynamic of an interaction between an expert and novice speaker whereby input, or language exposure, is a determinant of language acquisition. However, quantity of input through such interactions alone cannot guarantee specific proficiency levels. The needs assessment results (see chapter two) confirm this notion.

Summary of Needs Assessment and Rationale for Further Study

The needs assessment categorized proficiency test takers into two categories: heritage or native speaker. In accordance with previous studies in the literature, heritage (H) speakers in this study are defined as individuals whose age of onset (AO) of the second language or L2 is greater than or equal to 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). Native (N) speakers are defined as individuals with an AO of L2 is less than 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). Using data from existing proficiency exam in the researcher's school district, the needs assessment study addressed three research questions regarding the difference in means of proficiency levels (composite, literal, and oral) and learner type (H or N). The results of the needs assessment study reveal that there is a

statistical difference in means for composite (sum of listening, speaking, reading and writing) and literal (sum of reading and writing) proficiency levels between heritage and native speakers.

The results of the needs assessment for N speakers are reasonable given that these students most likely experienced academic schooling, which particularly includes the development of reading and writing skills up to the age of 12. In comparison, a heritage speaker speaks the target language to varying degrees and may or may not have reading and writing skills (Valdés, 2014). However, there is no statistical difference in means of oral proficiency between the two groups. This suggests that oral proficiency levels vary regardless of an individual's amount of target language exposure. Furthermore, the needs assessment confirms that the AO of the L2 before or after the age of 12 is not the sole factor that relates to H and N speaker proficiency levels (Bylund et al., 2012). Although the amount of L1 exposure is a factor, it does not determine in isolation an individual's L1 proficiency levels. If the categorization as a H or N does not ascertain proficiency levels, then what other factors are associated with proficiency levels? The results of the needs assessment inform the following study, which correlates the quantity and contexts of language exposure for the acquisition and maintenance of a LOTE.

The Role of Contexts and Social Interaction in Language Learning

Beyond the home, additional environments serve as contexts to gain target language exposure. These settings include school, work, extracurricular activities, communication for social purposes, and the target language community itself. The social interaction between peers and/or more knowledgeable others (Vygotsky, 1978) persists as a crucial factor when considering the individual factors that contribute to language acquisition (Donato, 2000; Mitchell et al., 2013). As such, the type of social interaction may differ among the different settings. For example, active construction of language development occurs among family members in the

home settings for heritage and native speakers of languages other than English (LOTE) (Donato, 2000; Lantolf et al., 2015). The amount of target language that the family uses in the home may vary in quantity, purpose, and level of complexity (Brecht & Ingold, 2002; Jia & Aaronson, 2003; Singleton & Pfenninger, 2019).

In accordance with sociocultural theory (Vygotsky, 1978), prior language exposure reflects social interaction between the individual and a "more capable peer" (p. 86). Due to the caretakers at home who function in the target language, heritage and native speakers interact with those language models from childhood. Native bilinguals are characterized by an older age of arrival to the U.S. (after the age of 12) compared to the heritage speaker (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). Therefore, native speakers completely develop the maternal language as their dominant language before the introduction of the community's majority language (Benmamoun et al., 2013). However, heritage speakers often experience incomplete acquisition of their first language prior to the onset of the majority language (Benmamoun et al., 2013), which includes school and social contexts outside of the home. In other cases, heritage speakers fully acquire their maternal language, but undergo language erosion in favor of the majority language (i.e., English) over time (Benmamoun et al., 2013; Montrul, 2005). Therefore, the maternal language proficiency of heritage speakers varies within a broad range (Grosjean, 1998).

The traditional length of language exposure calculated by age does not account for such variances in language experiences (Unsworth, 2016). In other words, the categorization as a H or N speaker does not explain their language abilities. The differences of language experiences and proficiency levels even within the same learner type category are meaningful factors to examine the low supply of advanced world language speakers. The quality of contact hours,

settings of target language exposure, and cumulative target language exposure of the learner are variables in the process of language learning (Unsworth, 2016). Furthermore, there are various contexts of learning after initial onset of a language which support the maintenance and growth of language proficiency. For example, language immersion in target language social or academic settings elicits interaction with the language sources in the context in order to function (Knight & Schmidt-Rinehart, 2010). In other words, language immersion over an extended period of time provides significant linguistic input (Krashen, 1982). Some individuals may receive formal instruction in the target language at school and/or other academic institutions. Others language experiences may include extended time living abroad, which has a positive effect on communicative interaction (Jochum, 2014). These examples describe the various language experiences of individuals that may relate to language proficiency levels.

Rationale and Explanation for Further Study

Both H and N speakers of LOTE possess an advantage in language abilities due to their prior exposure and maintenance of the language over time (Brecht & Ingold, 2002; Jia & Aaronson, 2003; Montrul, 2005; Parameshwaran, 2014). However, the results of the needs assessment study indicate that the simple classification as H or N does not ascertain proficiency levels. In reference to the language acquisition theories and sociocultural theory explained previously, additional factors such as the types of social contexts (Bruner, 1985), social interactions with language models (Vygotsky, 1978), and quantity of such language input (Krashen, 1982) contribute to the multi-faceted language acquisition process.

The establishment of social interaction as a factor in the complex language acquisition process exposes the need to study the quantity and type of target language exposure across different contexts. Given the need for advanced proficiency speakers of languages other than

English (LOTE) in the U.S. (U.S. Department of Education, 2008; Malone et al., 2003), this research study focuses on understanding the varied contextual factors of linguistic experiences. Specifically, the researcher correlates factors related to the acquisition and maintenance of a LOTE at advanced proficiency levels beyond the labels of H and N. To accomplish this purpose, the researcher uses existing language background data from her professional organization and proficiency scores as the instrument to collect data. The following sections describe the purpose of this research study, the research questions, instrumentation, and data analysis.

Research Questions

The needs assessment led to the conclusion that the categorization of H and N speaker types does not establish proficiency level levels. In addition to the amount of language exposure, other extralinguistic factors such frequency, settings of language use, and cumulative amount of language use are also essential to understanding proficiency level outcomes (Köpke & Schmid, 2004; Unsworth, 2016). Therefore, the researcher describes student LOTE background factors and determines the correlation between such factors and proficiency scores. In addition, the researcher pinpoints the cumulative amounts of language exposure of H and N who speak a LOTE at advanced levels. In order to meet this purpose, the researcher focuses on the following set of research questions:

1. What is the average amount of target language exposure within different contexts (home, school, or abroad in the target language environment) of students who are speakers of a LOTE?
2. What is the correlation between target language exposure and proficiency levels of students who speak a LOTE?

3. What is the cumulative (past and current) amount and average quality of language exposure of H and N speakers who have advanced language proficiency skills in LOTE?
4. What is the relationship between the cumulative amount (past and current) of target language exposure and advanced proficiency levels of H and N speakers of LOTE?

Table B1 in Appendix B outlines the research design and data analysis. Further explanation follows the table. Research questions 1 and 2 comprise the first set of research questions, which focus on all middle and high school students who took the CBE proficiency test, regardless of their scores. The inclusion of all test takers represents the range of varying proficiency levels, which is reflective of the skills in the greater population of LOTE speakers (Montrul, 2005; Valdés, 2001). The diverse language acquisition experiences of LOTE speakers further provides the rationale for analyzing the amount of target language exposure and the settings of language use regardless of their proficiency scores. Therefore, the first research question emphasizes the quantity of target language exposure in different settings (familial, academic, target language country) that reflect the various language experiences of all LOTE speakers in the dataset. The researcher describes target language exposure through this question. Data from research question 1 operationalizes the construct of target language exposure, which thereby informs Research Question 2. In the second research question, the researcher hypothesizes that there is a positive association between target language exposure in different settings (see Table B2 in Appendix B) and proficiency levels.

Research Questions 3 and 4 comprise the second set of research questions (see Table B1 in Appendix B), which narrows the sample to LOTE speakers of advanced proficiency levels. While Research Questions 1 and 2 include a broad scope of LOTE speakers and the correlation

between language exposure and proficiency, the second set of questions focus on the language background factors specific to the advanced H and N LOTE speakers. Specifically, the factors of interest are the cumulative amounts of target language exposure within different contexts of language acquisition of H and N speakers. The cumulative amount of language reflects the aggregate of past exposure and current language maintenance over time of H and N speaker types. In Research Question 3, the researcher will describe the cumulative amounts and quality of target language exposure that characterize the advanced speaker sample using the data from the language background questionnaire. In Research Question 4, the researcher hypothesizes a positive association between the cumulative amount of target language exposure and advanced proficiency levels of H and N speakers of LOTE. Together, the descriptive and quantitative analyses explain the factors of quantity and quality of language exposure over time that characterize and are associated with LOTE proficiency levels.

Methodology

The researcher employs a quantitative approach to examining all four research questions which concern LOTE language exposure and proficiency levels. Quantitative measures of existing data through student proficiency tests and an online questionnaire comprise data for both sets of research questions of the research study. The following sections describe the sampling method, measures, procedure, and data analysis of the study.

Sampling Method and Participants

The researcher uses existing proficiency and language background data to answer the research questions. The participant population represented in the data are a subset of all students in the school district who possess prior LOTE skills and wish to gain course credit for their skillset. To meet state law, the school district provides a Credit by Examination (CBE), an

assessment for course credit in Grades 6-12 (Texas Education Agency, 2014c). This exam is available to all secondary students who already possess LOTE skills. The exam results include the proficiency and language background data.

The researcher employed a convenience sampling method, since she has access to the data through her role in the school district (Pettus-Davis et al., 2011). The sample is constructed from the student population who chose to take the CBE. This study draws upon two student groups who already speak a LOTE: 1) all LOTE CBE participants regardless of proficiency level and 2) advanced proficiency LOTE speakers. Therefore, the participant sample represents a non-random selection. Discussion of the instrument and population of the proficiency and language background data available to the researcher follows.

Instrument. Based on the students' score, the CBE can award students up to four credits of a world language toward the necessary two LOTE credits for high school graduation. Students are able to take the CBE in one of 36 available languages throughout the academic school year at every secondary school through one of two different proficiency tests from Avant Assessment: STAMP 4S or WorldSpeak. However, high volume testing occurs at the beginning of the fall and spring semesters in order to award proper credit and thus determine appropriate course schedules for the students. For the purposes of this study, the researcher uses the STAMP 4S CBE data only. The STAMP 4S test assesses proficiency in all four language domains: listening, speaking, reading, and writing. The WorldSpeak test, which is available in languages that are less commonly taught in the U.S., only assesses proficiency in the areas of speaking and writing. Since the WorldSpeak test does not include listening and reading scores, the researcher did not include the results as a part of the research study data.

Participants. The convenience sample includes two groups for the purposes of this research study. Both groups of students include a combination of middle and high school level students who speak at least one LOTE. The first group represents all middle and high school level students who took the CBE regardless of proficiency score results. The second sample group represents a subset of the larger group described above. This specific subgroup includes test-takers who scored at least "Intermediate-High" (score of 6) on the listening, speaking, reading and/or writing portions of the exam. As an Intermediate-High level speaker, the student communicates with confidence and demonstrates abilities of the next major level (Advanced) (ACTFL, 2012a). The researcher identified the test-takers with at least "Intermediate-High" and use the student responses of an online language background questionnaire. These responses are readily available, since students answered these questions as part of their CBE exam.

The researcher obtained HIRB (#HIRB00009287) and local research committee permission to include these existing data of minors for the purposes of the needs assessment and the follow up of this research study. As part of the researcher's school district testing permission protocol, parents automatically receive permission forms to allow their children to take the CBE, which includes questions regarding their language acquisition background. The researcher included an additional parent permission form in this testing protocol which grants the use of the language background information for collecting the data for the school district which can be used as pre-existing data for the purposes of this research study. In addition to English, the researcher translated the permission form in Spanish and Korean, which represent the two most commonly administered CBE language tests in the researcher's school district. The following section delineates the instrumentation and measures for data regarding the research questions posted above.

Instrumentation and Measures for Proficiency Levels

The researcher utilizes proficiency scores from the STAndards-based Measurement of Proficiency (or STAMP) 4S test developed by Avant Assessment at the University of Oregon. The researcher's school district uses the STAMP 4S test as the official CBE to award high school LOTE credit for graduation purposes. The school district uses the STAMP 4S test to measure proficiency levels for several reasons. First, STAMP 4S is an adaptive test taken on the computer that measures a student's proficiency levels in the language domains of reading, writing, listening, and speaking (Santos, 2019). The Texas Administrative Code requires a certain range of proficiency outcomes per language course level to award credit (Texas Education Agency, 2014b). The STAMP 4S score report aligns the proficiency level outcomes with the Texas proficiency level expectations for each course, which facilitates the proper awarding of credit. The proficiency levels use the ACTFL Proficiency Guidelines framework (2012b), as described in chapter one of this research study, which is the same proficiency framework that defines the Texas standards of proficiency outcomes in each language level. The score report indicates the proficiency levels through ordinal values (1-9), which represent the three sublevels (low, mid, high) within the three major proficiency levels: Novice, Intermediate, or Advanced. Secondly, the STAMP 4S test is an established and widely used instrument. The test is currently available in 15 languages, which includes the most common home languages representing the district's student body. In the 2018-2019 academic school year, over 200,000 students took a STAMP 4S test across the U.S. and international schools abroad (Avant, 2019d). Thirdly, Avant Assessment determined the instrument validity of the STAMP 4S through several ways.

The validity of the STAMP 4S instrument refers to the degree of which the results or scores represent the proficiency of the individual (Golafshani, 2003). According to Lochmiller and Lester (2017), there are different ways to increase the validity of the instrument. Santos (2019) describes how the test development process increases the validity of the STAMP 4S assessment through various steps. Prior to the test development, the authors of the assessment defined the specifications which drive the format and purpose of the test (Santos, 2019). The test specifications include determinations such as a description of the test, the attributes and types of the items, and the scope of topics commensurate to the ACTFL proficiency levels (2012b) (Santos, 2019). The definition of the test specifications ensures the development of comparable test items and improves the reliability and validity of the instrument (Santos, 2019). Educated native speakers whose credentials are verified serve as the target language experts to create the test items and content according to the pre-established specifications per proficiency level (Santos, 2019). Multiple choice comprehension questions for reading passages undergo an internal review to check for appropriate level, a single correct answer, and freedom from bias that favors the prior knowledge and experiences of one test taker over the other within the same proficiency level (Santos, 2019). Further internal review ensures that the adaptive behaviors of the test, route the appropriate items and the level of difficulty according to the test taker's responses (Santos, 2019).

Instrumentation and Measures for Language Background Factors

The researcher uses responses from the administration of an online questionnaire from two sources. The first source of data is the language background questionnaire which comprises the first section on the STAMP 4S assessment. Students answer the questionnaire prior to initiating the proficiency test items. The questionnaire asks test takers to indicate information

regarding their home language, the frequency with which they speak the home language, and how many years they may have studied the target language or lived abroad (Avant, 2019e). Table B2 of Appendix B includes the specific question items from the STAMP 4S assessment questionnaire. The school district began utilizing the STAMP 4S test at the beginning of the 2019-2020 academic school year. Therefore, the researcher utilizes the questionnaire data from the STAMP 4S test acquired in the school district between the dates of May 2018 to November 2020 to answer the first set of research questions. A total of 994 students took the CBE STAMP 4S test between these dates. Due to the onset of the COVID-19 pandemic, the school district began remote at-home instruction in March 2020. Therefore, students resumed CBE testing in August 2020.

The second source of data is the language background questionnaire, which consists of established items from the Bilingual Language Exposure Calculator, or BiLEC (Unsworth, 2016). The BiLEC gathers information about quantity and quality measures of an individual's language experiences (Unsworth, 2016). The school district employed the BiLEC at the beginning of the 2019-2020 academic school year as a part of the CBE testing protocol. Fifteen students responded to the BiLEC questions. The author (Unsworth, 2016) designed the BiLEC as an interview protocol, but she acknowledges the possibility of structuring the items in the BiLEC as an online questionnaire. Included in the BiLEC are biographical questions that determine each participant's learner type of H and N speakers, as conducted in the needs assessment described in chapter two.

Furthermore, the BiLEC asks questions related to the quantity of social interaction in the target language, quality, and contexts of LOTE use and exposure over time in childhood and present contexts. The participant responses to each item are entered into the BiLEC spreadsheet,

which contains algorithms to quantify the following constructs: 1) amount of current and past language exposure (input and output) in various settings, 2) current quality of language exposure in various settings, 3) length of target language exposure (cumulative and traditional). The use of algorithms to calculate language experience variables through a spreadsheet distinguishes the BiLEC from other existing language background questionnaires (Unsworth, 2016). The researcher analyzes the following data from the BiLEC questionnaire to operationalize the main construct of target language exposure, which embodies the second set of research questions.

Amount, quality, and settings of current language exposure. The BiLEC calculates the participant's exposure to and use of the target language (TL) both in quantity and quality. The instrument calculates the quantity of target language exposure as the difference between the date of first, consistent, and significant exposure to the TL and the present date. Respondents indicate the quality of TL exposure measured by the type of initial exposure and their own abilities to speak and understand the TL. The type of initial exposure specifies the source or context of language input: parent(s), sibling(s), grandparent(s), nursery/daycare, au-pair/nanny/babysitter, school (general), school (language class), or ambient language. The participants indicate their abilities to speak and understand the TL on a scale of 0 to 5, where 0 indicates no abilities and 5 signifies native-level abilities (see Table D1 of Appendix D for full description).

The BiLEC also measures the amount and quality of language input that the participant receives on a regular basis at home. Respondents indicate the approximate age of first exposure to TL for each member of the household and how often each member speaks to them on a regular basis in the TL using a five-point percentage scale in quarter increments (see Table D2 of Appendix D for further descriptions of the scale). Respondents also estimate the household

member's abilities to speak and understand the TL as an indicator of language input quality (see Table D1 of Appendix D for scale).

The BiLEC measures the quantity and quality of languages spoken by the respondent to other people at home and on holidays. The respondent indicates the percent of target language (TL) spoken to others on a scale of 0 to 1 using the scale in Table D3 of Appendix D. In addition, the same scale is used to indicate the amount of time that the respondent spends during the week and on weekends with members of the household, in school, and in after-school care. The respondent also indicates the hours per week of and the amount of TL used with other sources of language exposure such as sports/clubs, friends, reading, television, and/or computer time. The overall quality of TL exposure for each type of contact is expressed on a scale of 0 to 5 using the scale in Table 1 of the Appendix D. If the participant speaks additional languages, the same data are collected for all mentioned items. For the purposes of this research study, the TL, which is also the language in which the participant took the CBE test, is the relevant language for the items in the questionnaire.

Amount and settings of past language exposure. The BiLEC probes into the respondent's past language exposure. The instrument asks participants about the approximate number of days per week that the individual spent at daycare in a given one-year time period from the age 0 to the individual's current age. Participants respond to questions regarding the percentage of TL spoken in the daycare, out-of-school care, and school settings. The BiLEC also asks about the percentage of target language that household members spoke to the participant in the past for each one-year time period up to the participant's present age. Finally, the participant indicates how much contact the individual had with the TL during the holidays as a percentage using the scale in Table D3 of Appendix D.

Current language exposure. The BiLEC employs the above data to arrive at quantity and quality oriented measures using algorithms in an Excel spreadsheet. The current amount of target language (TL) exposure is expressed as an average percentage for each type of context (i.e., home, school, holidays, etc.). The quantity of current output in the home and other sources of TL exposure are also expressed as an average percentage using the items mentioned in the previous sections. The algorithms also compute the average quality of TL exposure of each type of context using the scale in Table D1 of Appendix D to describe the numerical values. Such calculations also include the number the average percent exposure to native versus non-native TL speakers and the number of individuals with whom the participant has an exclusive TL communicative relationship.

Cumulative length of exposure to TL. Using the data from the questionnaire, the BiLEC calculates the total length of exposure to the TL across all settings. The cumulative length of exposure (LoE) is expressed in years after accounting for the participant's age at the time of the questionnaire. The traditional method of LoE of the TL is calculated as a difference between the student's age at the time of the questionnaire and the age of onset of the TL. The cumulative LoE differs from the traditional method of LoE. The traditional method of LoE does not account for variances in language exposure and experiences from the age of onset and forward. The cumulative LoE provides a more accurate understanding of the amount of language exposure since it accounts for any gaps in exposure that may occur beginning from the age of onset.

The quantitative measures collected through the online version of the BiLEC operationalize the construct of target language exposure in different settings. The BiLEC measures address the second set of research questions, which are: 1) average percent of present

target language exposure per week in various settings, 2) average quality of target language exposure in various settings, and 3) cumulative and traditional lengths of exposure to target language calculated in years. Utilizing these data, the researcher describes: 1) the target language exposure of advanced LOTE speakers 2) the quantity and quality of language exposure in different settings of advanced LOTE speakers, and 3) the cumulative amount of language exposure of heritage and native advanced speakers of LOTE. Furthermore, the researcher conducted a correlational study to determine the relationship between 1) the target language exposure and proficiency levels of LOTE speakers and 2) the cumulative amount of target language exposure and proficiency scores of advanced speakers of LOTE.

Procedure and Analysis

The cooperation of the researcher's local committee and coordination with campus testing facilitated data collection through existing protocols. The HIRB at Johns Hopkins University approved the research study for use of existing data of minors from the language background questionnaires. The researcher used the existing data from the language background questionnaire and proficiency scores from the STAMP 4S test to answer the first research question. The researcher used the data from the BiLEC language background questionnaire of students who scored at Intermediate-High (6) or above in at least one area of the CBE.

Using biographical data from the language background questionnaires, the respondents were categorized as H or N speakers. For the purposes of this study, a native speaker is defined as an individual who acquired the target language in childhood whose internalization of the language allows for intuitive command and use of the language (Davies, 2004; Unsworth, 2013). A heritage speaker is an individual who is proficient to some degree in English and in his/her mother tongue, which has been maintained in the home, community, or in specialized

world language programs in the American school system (Brecht & Ingold, 2002; Unsworth, 2013; Valdés, 2014). Consistent with the categorization of speakers used in the needs assessment, H speakers have an age of onset (AO) of English prior to the age of 12 (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). Native bilinguals are characterized by an older age of arrival to the U.S. (after the age of 12) compared to the heritage speaker (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000).

Descriptive analysis. The Research Questions 1 and 3 prompt descriptive analyses. The researcher used descriptive statistics (e.g., mean, standard deviation, range) to answer these questions. The first question asks for a description of target language exposure of the STAMP 4S test takers. The researcher reported the descriptive statistics for target language exposure. The measures for exposure include how often family members speak with the test taker, the number of years the test taker studied the target language, and the number of years living in a target language country.

The third research question concerns the cumulative (past and current) amount and average quality of language exposure in different settings of advanced speakers. The researcher inputted the data collected from the online questionnaire into a BiLEC spreadsheet (Unsworth, 2013) per respondent. Each BiLEC spreadsheet contains algorithms that calculate the variables mentioned above regarding the amount, quality, and type of past and current language exposure and cumulative length of exposure (LoE) to the target language (TL). The calculations from the algorithms were used as data for the quantitative analyses. Therefore, the researcher used descriptive statistics for the average quality of target language exposure in the following settings: home only; home and school; home, school, and extracurricular settings; and home, school, extracurricular, and holiday settings. The researcher calculated the cumulative amount of

language exposure of advanced LOTE speakers using the algorithms calculated in the BiLEC spreadsheet. The cumulative amount of language exposure includes the accumulation of current (maintenance) and past (initial acquisition) exposure to the TL (Unsworth, 2013). The researcher reported the descriptive statistics of the cumulative LoE for both H and N learner types within the advanced speaker sample.

Correlational analysis. The researcher conducted a correlational study to determine if there is a relationship between target language exposure and proficiency levels (Research Questions 2 and 4). Using the language background STAMP 4S data, the researcher used the following measures to operationalize target language exposure to answer Research Question 2: frequency that family members speak to the test taker (ordinal); years of study of the language (ratio); and the number of years living in a target language (ratio). To operationalize cumulative length of target language exposure (ratio), the researcher used the calculation from the BiLEC algorithm.

Consistent with the needs assessment in chapter two, the reading and writing STAMP 4S scores operationalize literal proficiency levels, while the listening and speaking STAMP 4S scores operationalize the oral proficiency levels. The scores are ordinal data which signify the student's ranking of proficiency on a scale of 1-9 which correspond to three different sublevels (Low, Medium, High) across three major proficiency levels (Novice, Intermediate, Low). Due to the levels of measurement of the variables for average quality of language exposure and the scaled proficiency scores, the researcher used a Spearman's rank order correlation to analyze the strength and direction of association between target language exposure (continuous), quality of language exposure (ordinal), and proficiency levels (ordinal) for Research Questions 2 and 4.

Together, the descriptive and correlational analyses constitute a deeper examination of the personal language background factors and the relationship between those factors and proficiency levels. Such factors include not only the quantity of language exposure, but also the quality of such interactions with other speakers of the target language. The findings from these analyses provide understanding of the varied language backgrounds that are related to acquiring and maintaining a LOTE.

Conclusion

The United States needs Advanced level speakers to meet national and international needs (U.S. Department of Education, 2008; Malone et al., 2003). Although abilities vary, many heritage and native speakers possess language skills which provide an advantage to reach Advanced level proficiency levels (Brecht & Ingold, 2002). The research study provides a description and correlation of language exposure factors concerning advanced level speakers of LOTE. Reflective of sociocultural theory, language acquisition is a social process which is embedded in various contexts that drive an individual's experiences (Vygotsky, 1978). Thus, quantity, quality, and types of contexts illustrate the varied language backgrounds that characterize those experiences (Unsworth, 2016). The results of this research study should inform organizational, individual, and familial decisions on quantity and types of such language exposure for linguistically optimal acquisition and maintenance.

Chapter 5: Findings and Discussion

The purpose of this chapter is to present the findings and discussion of the extralinguistic, or contextual factors (Köpke & Schmid, 2004) associated with advanced speakers of a language other than English (LOTE). The researcher presents a description of these factors below. The data to examine such factors originate from the researcher's school district. Chapter three discussed the importance of advanced proficiency speakers of world languages to address the economic and security priorities of the U.S. The chapter concludes with the limitations of this study and areas for future exploration.

As previously stated in chapter four, the following quantitative research questions address the findings presented in this chapter. The first two research questions (RQ) describe and correlate the key contextual factors of all LOTE speakers in the dataset.

Research Question 1: What is the average amount of target language exposure within different contexts (home, school, or abroad in the target language environment) of students who are speakers of a LOTE?

Research Question 2: What is the correlation between target language exposure and proficiency levels of students who speak a LOTE?

The null hypothesis (H_0) and alternative hypothesis (H_1:) are:

H_0: There is no association between target language exposure and proficiency levels of students who speak a LOTE.

H_1: There is an association between target language exposure and proficiency levels of students who speak a LOTE.

The other two research questions describe and correlate the contextual factors of advanced speakers only in the dataset.

Research Question 3: What are the cumulative (past and current) amount and the the average quality of language exposure of H and N speakers with advanced language proficiency skills in LOTE?

Research Question 4: What is the relationship between the cumulative amount (past and current) of target language exposure and advanced proficiency levels of H and N speakers of LOTE?

The null hypothesis (H_0) and alternative hypothesis (H_1:) are:

H_0: There is no association between the cumulative amount of target language exposure and advanced levels of H and N speakers of LOTE.

H_1: There is an association between the cumulative amount of target language exposure and advanced levels of H and N speakers of LOTE.

A summary of the data collection process and preparation precedes the analysis and findings.

Amount of Target Language Exposure in Different Contexts: Research Question 1

The researcher used existing data from a credit-by-exam (CBE) proficiency assessment to respond to the first three research questions. The CBE is a third-party proficiency test called STAndards-based Measurement of Proficiency (STAMP) 4S published by Avant Assessment. The STAMP 4S includes a language background questionnaire. The date range for the CBE assessment results are from May 2018 to November 2020. In total, 994 test results (regardless of the score) comprise the initial data sample targeted for this study. The following table illustrates the number of tests per language represented in the sample.

Table 5.1

Number of Tests Per Language

Languages	Number of Tests
Spanish	833
Arabic	7
Chinese Simplified	21
Chinese Traditional	3
French	11
German	5
Hindi	4
Italian	2
Japanese	5
Korean	98
Portuguese	3
Polish	1
Russian	1

The majority of students in the dataset are 9th (n = 444) and 10th-grade (n = 217) students.

The first research question addresses the average amount of target language exposure within different contexts of each student. The contexts include home, school, and the target language country. As discussed in chapter three, each context implies different types of language learning due to its emphasis on the purpose of language use in that particular setting. Table B2 of Appendix B includes the items in the language background questionnaire of the STAMP 4S proficiency assessment.

Home

To measure the amount of target language exposure in the home context, the researcher used the responses to the question, "How often do you speak [target language] at home?" The

researcher coded the answer choices in order of frequency. Table 5.2 below illustrates the answer choices, codes, and counts of student responses.

Table 5.2

Frequency of Target Language Exposure at Home

Frequency of Target Language Spoken at Home	Code	Number of Students
Never	0	17
Less than once a year	1	3
1-2 times per year	2	2
every few months	3	7
1-3 times a month	4	14
1-2 times a week	5	60
Everyday	6	813
Family does not speak the target language		23
No response		55

As illustrated in the Table 5.2, 55 test-takers did not respond to this question out of the 994. Out of the individuals who responded, the vast majority (81.8%) of students speak the target language at home daily. The researcher recognizes that the codes of zero to six do not represent equal increments of frequency. However, the mean frequency of the target language spoken at home is 5.74 (*SD* = .957). On average, students in this dataset speak the target language at home nearly every day.

Formal Study

Nearly all students who completed the language background questionnaire indicated prior study in the target language, however, the type of schooling is unknown. As discussed in chapter three, the kind of schooling varies for language learning. Student responses could indicate study at a heritage language school, community school, formal schooling in the target language country, language courses at school, or specialized language programs such as immersion

education. Furthermore, the students may have studied the language informally, for example, at home. Because the question item asks, "How many years have you studied or spoken [the target language]?", students' responses vary on their intent to specify schooling in the target language. Table 5.3 shows the counts for how many years the students studied or have spoken the target language.

Table 5.3

Number of Years Studied or Spoke the Target Language

Number of Years	Number of Students
0 years	0
1 year	24
2 years	16
3 years	12
4 years	8
5 years	12
6 years	7
7 years	4
8 years	14
9 years	15
10 years	24
11 years	8
12 years	33
13 years	74
14 years	222
15 years	203
16 years	237
17 years	0
18 years	0
Did not answer	81

Out of the 994 test-takers, 81 students did not answer the question regarding the number of years studying or speaking the target language. Out of 913 responses, the average number of years that the students studied or spoken the target language is 13.29 years (*SD* = 3.696).

Life in Target Language Country

Another measure of exposure to the target language is the number of years living abroad in a target language-speaking country. Two items on the language background questionnaire address this variable. First, the questionnaire asks the student: "Have you studied or lived in a country where [the target language] is the national or primary language?" Out of the 994 test-takers, 42 students did not respond to this question. Among the students who responded to the question, 434 students indicated they lived abroad, and 518 students answered that they had not.

The next item in the questionnaire asks: "How long were you there?" Students indicate the number of months and years they lived abroad. Out of the 434 students who responded they lived abroad, 423 students answered the question of how long they lived in the target language country. However, out of the 423 students who responded to the question, six responses were unintelligible. All six students wrote the calendar year (e.g., 2002, 2004, 2012, etc.) as the number of years and the calendar month (e.g. "dasember", "8", etc…) as the quantity of months. Thus, the researcher could not compute those responses. Among the intelligible responses, the smallest value was "1 month". Therefore, the researcher converted all answers to this question in the form of months rather than "months and years". The conversion allowed for comparisons within the dataset for all responses to this question item. Out of the 417 answers, the minimum length of time abroad is 0 months, while the maximum length of time abroad is 228 months or 19 years. The mean length of time abroad is 102.08 months or 8.51 years (*SD* = 70.23 months or 5.85 years).

Table 5.4

Target Language Exposure

Setting of Exposure	Number	Mean	Standard Deviation
Home (frequency)	916	5.74	.957
Study (years)	913	13.29	3.70
Life Abroad (months)	417	102.08	70.23

Table 5.4 presents in a single table the descriptive information for target language exposure discussed above.

Target Language Exposure and LOTE Proficiency Levels: Research Question 2

Research Question 2 focuses on the correlation between target language exposure and LOTE proficiency levels using the same dataset described in the previous section. The same measures listed above for home, school, and life abroad comprise the variables of target language exposure. The LOTE proficiency skills include oral (sum of listening and speaking results), literal (sum of reading and writing results), and composite (sum of oral and literal) scores. The listening, speaking, reading, and writing scores are derived from the STAMP 4S results. The scores range from one (Novice-Low) to nine (Advanced High).

Out of the 994 STAMP 4S test results, 58 tests were not ratable in at least one section (speaking or writing) of the exam. Reasons for non-ratable scores include one of the following: failure to use target language, not addressing the topic of the prompt, use of incorrect language, or no response detected (Avant, 2019f). Because Research Question 2 addresses the correlation of the individual's target language exposure with their STAMP 4S test results, the researcher reviewed the corresponding questions regarding home, study, and life in a target language country. In total, 843 composite, 845 literal, and 845 oral proficiency results include responses to the language background questionnaire.

Data Analysis and Results

The Spearman correlation measures the strength and direction of the relationship (Laerd Statistics, 2015) between target language exposure and LOTE proficiency levels. Target language exposure measures of study and life in a target language country are continuous variables. The frequency of target language use at home is an ordinal variable. The LOTE proficiency levels are ordered using a scale of 1 to 9. Due to the ordinal variables, the researcher uses a Spearman's rank order correlation to answer Research Question 2. Ordinal variables cannot determine the exact difference between one number in the scale and another (Laerd Statistics, 2015). In other words, on a scale of one to nine, the number 2 is not necessarily double the value of the number 1. For this reason, the Spearman rank correlation is appropriate to analyze the correlation of ordinal level variables in a small sample size (Laerd Statistics, 2015).

Table 5.5 organizes the *p* value, Spearman correlation coefficient (r_S), and number for proficiency and target language setting.

Table 5.5

Correlation for Proficiency and Settings

	Home	Study	Life Abroad
Literal			
r_S	.175	.124	.148
Sig. (2-tailed)	.000	.000	.004
Number	815	845	375
Oral			
r_S	.169	.096	.089
Sig. (2-tailed)	.000	.005	.085
Number	815	845	375
Composite			
r_S	.180	.115	.124
Sig. (2-tailed)	.000	.001	.017
Number	812	843	375

The researcher used a significance level of 0.05 and a two-tailed test. The two-tailed test allows for the testing of statistical significance in both directions of the relationship being hypothesized (Laerd Statistics, 2015). The results for each proficiency category and setting are all significant ($p < .05$). Since $\alpha = 0.05$, a statistically significant Spearman rank correlation assures a less than 5% chance that the strength and direction of the correlation was due to chance, if the H_0 were true (Laerd Statistics, 2015). However, statistically significant results do not conclude a strong relationship (Akoglu, 2018). The r_S, also signified as ρ (Laerd Statistics, 2015), values range from .089 (oral proficiency correlated with life abroad) to .180 (composite proficiency) with target language in the home, which are all greater than the p value. Since r_S p, the researcher rejects the null hypothesis and accepts the alternative. The researcher concludes that there is

statistical evidence to suggest weak, positive associations (Akoglu, 2018) with literal, oral, and composite proficiency scores for each setting.

Cumulative Length of Exposure of Advanced Speakers: Research Question 3

The traditional measure of an individual's length of language exposure is the current age minus age of onset (AO) (Unsworth, 2013). Heritage speakers are often simultaneous bilinguals, who often acquire their home language and majority language at the same time (Unsworth, 2013). Simultaneous bilinguals divide their time between two languages, which reduces their input in either language (Paradis & Genesee, 1996). Therefore, the cumulative length of exposure (CLE) draws a more accurate picture of how long an individual has received language modeling and input (Unsworth, 2013). The CLE measures the total of an individual's language exposure in the home, school, extracurricular, and social settings over his or her lifespan.

Data Preparation

As described in chapter three, the Bilingual Language Experience Calculator (BiLEC) (Unsworth, 2016) differs from other language background questionnaires. Individuals estimate the quantity and quality of language exposure and use of language over time in their daily settings. The BiLEC spreadsheet uses these estimates and calculates the CLE. Specifically, the spreadsheet algorithm first calculates the percentage of target language used in each setting (daycare, school, home, out-of-school, holidays) as a percentage of waking hours in each year of life. For example, what percentage of the student's life during the one-year period of two to three years of age did the student spend in the target language? The spreadsheet calculates the percentage (expressed as a decimal) for every one-year period of life from birth until the student's age at the time of proficiency testing. The sum of all decimals for each year of life

results in the cumulative length of exposure of target language use. over the total number of waking hours of each year of exposure.

Although the BiLEC is intended as an interview instrument, the researcher used previously collected BiLEC data which were recorded through a Google Form survey. The researcher identified the advanced proficiency students (scores of 6 or higher on at least one section of the proficiency exam). As described in chapter four, a score of 6 on the Avant proficiency exams corresponds to an Intermediate-High level on the ACTFL proficiency scale (Avant, 2019a). Speakers at the Intermediate-High level demonstrate abilities at the Advanced proficiency level, albeit not consistently (ACTFL, 2012a). Subsequently, the researcher inputted these existing data of advanced proficiency students into the BiLEC spreadsheet, which calculated the CLE for the target language. Fifteen student responses comprise the dataset for this question.

Based on the BiLEC student data, the researcher categorized the advanced proficiency student as either heritage (H) or native (N) speakers. Consistent with the definition of H and N speakers used in the needs assessment (chapter two), individuals with an AO of L2 greater than or equal to 12 years old (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000) are H speakers. Individuals with an AO of L2 less than 12 years old are N speakers (Abrahamsson & Hyltenstam, 2009; Yeni-Komshian et al., 2000). The following table (Table 5.6) illustrates the number of H and N speakers in the dataset, languages represented, and the range of AO of the L2.

Table 5.6

Speaker Types, Languages and AO in RQ #2 Dataset

Speaker Type	Number	Languages Represented	Age of Onset Range
Heritage	10	Spanish, Korean, Chin-Hakha, Polish, French, Vietnamese	0 (at birth) to 12 years old
Native	5	Korean, Urdu, Vietnamese	13 years old to 16.1 years old

Table 5.6 depicts that heritage speakers comprise the majority of the dataset for RQ #2.

Cumulative Length of Exposure

The cumulative length of exposure (CLE) represents the total amount of past and present target language use (Unsworth, 2016). As mentioned previously, the CLE is an important measure for simultaneous bilinguals, a term that describes the individuals represented in this dataset. The algorithm for CLE in the BiLEC sums the amount of time in the following areas of target language exposure of the individual's life: adult and sibling use of the language for every one-year period of the student's life; use of the TL in daycare or school; and use of the TL in holidays, which refers to vacation from school (Unsworth, 2016). For the purposes of this study, the researcher set the total quantity of holidays as 14 weeks, which she derived using a school district calendar. Appendix E presents the CLE, the traditional length of exposure based on chronological age, and the difference for the sake of comparison. The mean years of cumulative exposure are 11.995 (n = 15, SD = 2.946).

Quality of Language

Another factor that describes language exposure is the quality of linguistic inputs. The BiLEC operationalizes the quality of language in three ways: nativelikeness, the variety of language sources in different settings, and the number of people with exclusive target language

relationships with the individual. These self-reported ratings of the TL sources' nativelikeness range on a scale of 0 to 5, where 5 represents native fluency. Table 5.7 illustrates the mean of average quality measures of input sources in the following settings: home; home and school; home, school, and extracurriculars; home, school, extracurriculars, and holidays.

Table 5.7

Descriptive Statistics for Quality of Target Language Input

Setting	Mean	Standard Deviation	Number
Home	4.673	.575	15
Home and school	4.673	.575	15
Home, school, and extracurriculars	4.342	.756	12
Home, school, extracurriculars, and holidays	4.308	.709	12

Three students did not respond to enough questions to calculate the mean for the category "home, school, and extracurriculars" and "home, school, extracurriculars, and holidays". As illustrated in the table above, those two categories include 12 respondents. For the categories of "home" and "home and school", the means were derived from all 15 responses. The mean for TL input quality for all settings shown in the table lies between a rating of 4, which represents "excellent" ability ("understands almost everything in almost every situation"), and 5, which represents "native" ability ("understands pretty much everything") (Unsworth, 2016, p. 40).

Advanced Proficiency

The students in this dataset scored at advanced levels in one or more of the credit-by-exam (CBE) sections (listening, speaking, reading, and/or writing). As described in chapter four, these students scored a 6 on any section of the exam. Table 5.8 exhibits the descriptive results for proficiency.

Table 5.8

Advanced Proficiency Descriptive Statistics

	Mean	Standard Deviation	Number
Oral	13.646	1.362	11
Literal	12.900	1.287	10
Composite	24.091	8.263	11

Out of the total 15 students identified for this dataset, one student did not have proficiency scores, yet previously completed the BiLEC. Out of the remaining 14 students, some students took the STAMP 4S test (n = 11) as their proficiency exam, including listening, speaking, reading, and writing sections. Other students took the WorldSpeak test (n = 4) as their proficiency exam, which includes speaking and writing only. The previous discussion about the STAMP 4S and WorldSpeak tests appears in chapter four. Given the small sample size for Research Question 3, the researcher included all results in the findings, although the sample represents results from two different proficiency tests.

Cumulative Length of Exposure and Advanced Proficiency: Research Question 4

Research Question 4 examines the relationship between cumulative length of exposure (amount) and advanced proficiency scores. The CLE includes the amount (past and present), as well as quality of target language exposure. The researcher conducted a Spearman's rank order correlation to determine the strength and direction of the association.

Amount of Cumulative Length of Exposure: Data Analysis and Results

The findings in Table 5.9 illustrate the correlation between CLE and advanced proficiency. None of the results are statistically significant ($p = .716, p = .360, p = .947$). In

addition, each Spearman's rho (ρ) is less than .3, which signifies a weak negative correlation (Akoglu, 2018) between CLE and advanced proficiency.

Table 5.9

Correlation for Proficiency and Cumulative Length of Exposure

	Cumulative Length of Exposure
Literal	
r_S	-.132
Sig. (2-tailed)	.716
Number	10
Oral	
r_S	-.306
Sig. (2-tailed)	.360
Number	11
Composite	
r_S	-.023
Sig. (2-tailed)	.947
Number	11

Using the same methodology as in the data analysis for Research Question 2, the researcher used a significance level of 0.05 and a two-tailed test. The Spearman's ρ or r_S values are all less than the p values for each proficiency category (r_S = -.132, p = .716 for literal proficiency; r_S = -.306, p = .360 for oral proficiency; r_S = -.023, p = .947 for composite proficiency). Since $r_S < p$, the researcher rejects the null hypothesis and accepts the alternative. The findings signify an absence of statistically significant evidence for a correlational trend between the two variables. The implications of these findings suggest a deviation from the literature, which emphasizes the critical association between contact hours and language proficiency (Carroll 1967; Davidson, 2007; Segalowitz et al., 2004; U.S. Department of State, n.d.-b).

Given these findings, the researcher created a scatterplot (Figure 5.1) to inspect the trend visually. The Spearman's correlation illustrates the monotonic relationship between the independent and dependent variables (Laerd Statistics, 2015). In other words, the monotonic relationship reveals if the proficiency score (y-axis) increases or decreases when CLE (x-axis) increases. Figure 5.1 shows that there are as many high and low literal proficiency scores among those who have less amount of CLE as those who have a higher amount of CLE. The scatterplot does not suggest a clear monotonic relationship between literal proficiency and CLE of the target language, displaying a relationship either downward or upwards. The researcher did not include a regression line, given that the Spearman's rank-order correlation determines a monotonic, not linear, relationship (Laerd Statistics, 2015).

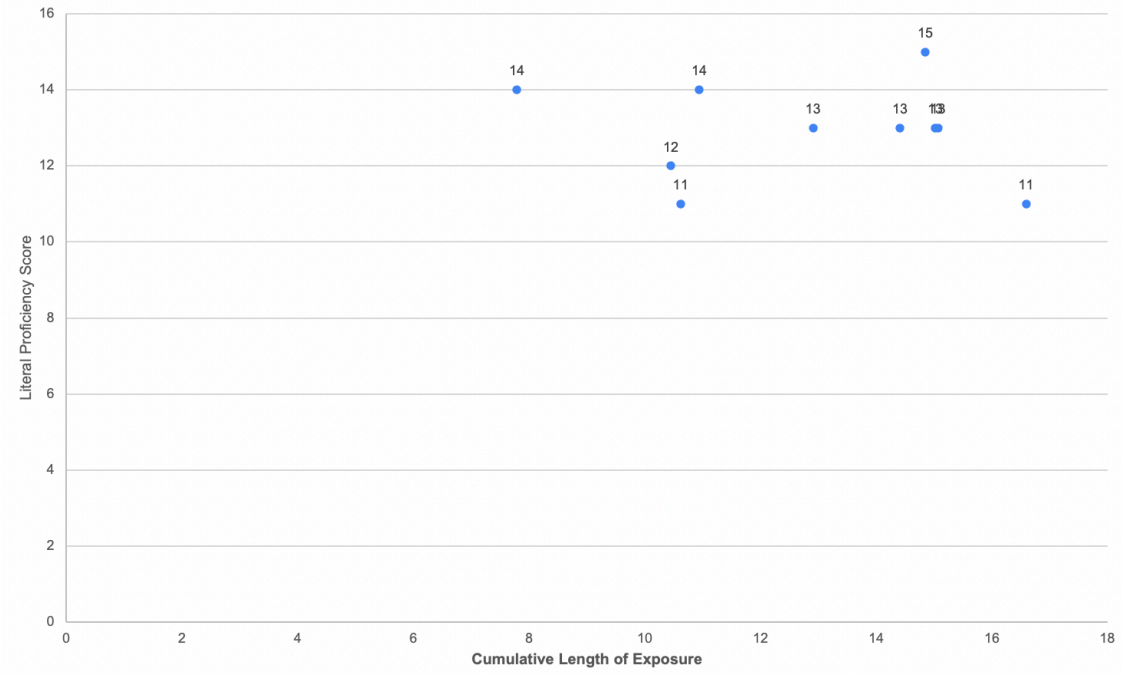

Figure 5.1. Scatterplot of Cumulative Length of Exposure with Literal Proficiency

Figure 5.2 below, also confirms a subtle negative monotonic relationship. As CLE increases, the oral proficiency slightly decreases. Figure 5.2 illustrates that there is a range of proficiency scores for CLE. The scatterplot suggests that oral proficiency does not correlate to CLE of the target language. For example, when considering the greatest amounts of CLE, the oral proficiency scores vary across the entire range (11 to 16).

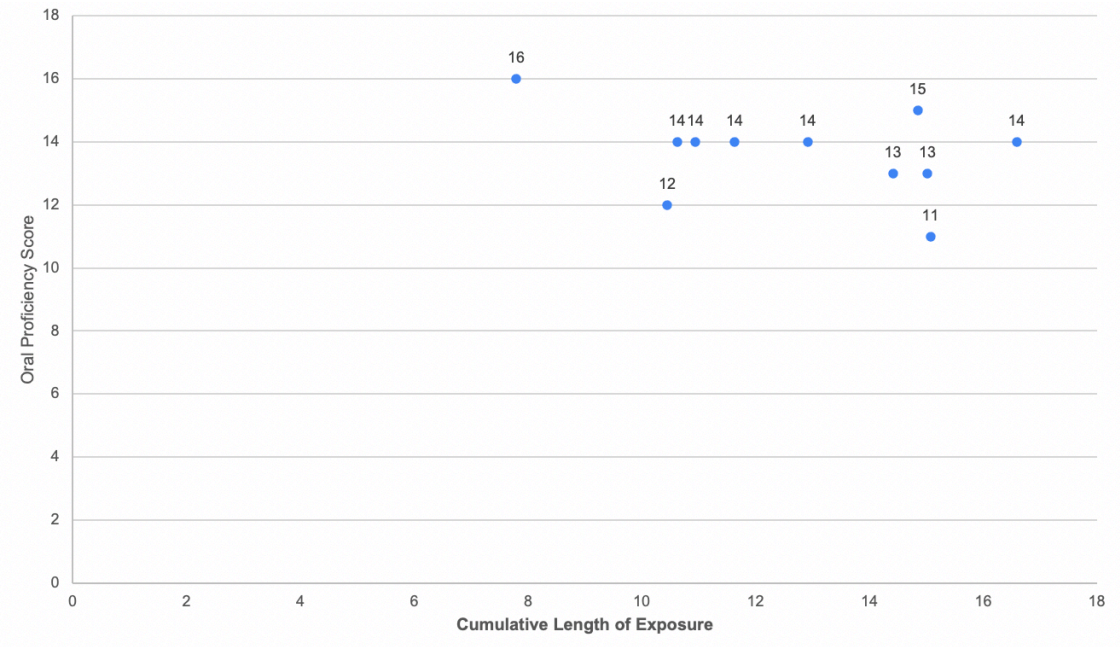

Figure 5.2. Scatterplot of Cumulative Length of Exposure with Oral Proficiency

Figure 5.3 below also depicts a slightly negative relationship for the correlation between composite proficiency and CLE.

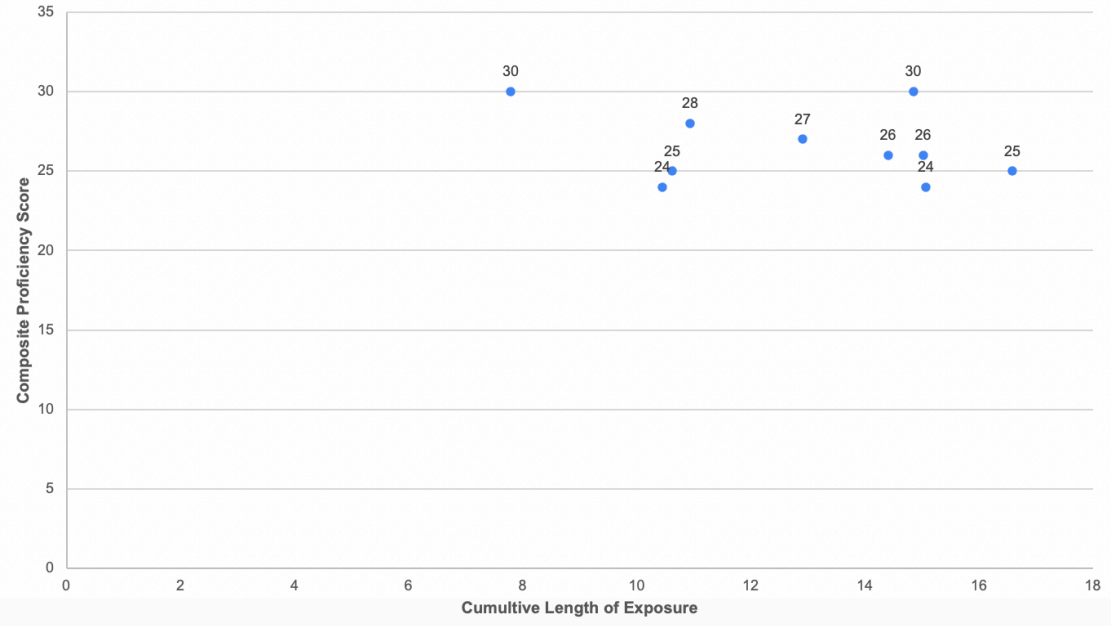

Figure 5.3. Scatterplot of Cumulative Length of Exposure with Composite Proficiency

Considering all three scatterplots and the Spearman's ρ values, the data show a lack of evidence regarding a monotonic relationship between the CLE and proficiency scores of advanced proficiency speakers. The scatterplots indicate that as CLE increases, the proficiency scores both decrease and increase. Therefore, the direction and strength of the relationship between proficiency and CLE are unclear.

Quality of Target Language Exposure: Data Analysis and Results

The second measure of CLE is the quality of the language input. As described in the previous section, the quality of language input is an ordinal variable that ranges from 0 to 5. The BiLEC calculates the average TL quality for the following settings: home, school, extracurriculars, and holidays. Table 5.10 organizes the Spearman's ρ and *p* value for proficiency in each setting.

Table 5.10

Correlation for Target Language Quality and Settings

	Home	Home/ School	Home/School/ Extracurricular	Home/School/ Extracurricular/ Holidays
Literal				
r_S	-.186	-.186	.364	.804
Sig. (2-tailed)	.607	.607	.376	.016
Number	10	10	8	8
Oral				
r_S	.310	.310	.293	.347
Sig. (2-tailed)	.354	.354	.443	.360
Number	11	11	9	9
Composite				
r_S	.186	.186	.519	.836
Sig. (2-tailed)	.584	.584	.188	.010
Number	11	11	8	8

The Spearman rank correlations for quality of TL exposure and proficiency reveal that there is no statistically significant relationship among literal, oral, and composite proficiency scores and settings for home, school, and extracurricular combinations. For example, for literal proficiency, r_S is less than the critical value for home, home/school, and home/school/extracurricular settings (r_S = -.186, p = .607; r_S = -.186, p = .607; r_S = .364, p = .376, respectively). For oral proficiency, r_S is less than the critical value for home, home/school, and home/school/extracurricular settings (r_S = .310, p = .354; r_S = .310, p = .354; r_S = .293, p = .443, respectively). For composite proficiency, r_S is less than the critical value for home and home/school settings only (r_S = .186, p = .584; r_S = .186, p = .584). However, the correlation for literal (p = .016) and composite (p = .010) proficiencies in the combination of home, school, extracurricular, and holiday settings is

statistically significant. In both cases, since r_S is more than the p value of home/school/extracurricular/holiday settings for both literal ($r_S = .804$, $p = .016$) and composite ($r_S = .836$, $p = .010$) proficiency at 5% significance level, the researcher rejects the null hypothesis and accepts the alternative. The research concludes that the Spearman's ρ indicates statistical evidence of a strong positive correlation (Akoglu, 2018) between the rankings of those settings and literal proficiency ($r_S = .804$) and composite proficiency ($r_S = .836$).

Discussion

The first set of research questions (see Table B2 in Appendix B) focus on the average amount of TL (home, school, and TL environments abroad) correlation of all CBE test takers regardless of proficiency score. The first set of research questions, which used a large dataset ($n = 994$), resulted in weak positive relations between amount of TL exposure and proficiency levels. The correlations described in the previous section yielded unexpected results. For Research Question 2, the researcher expected strong positive correlations between target language exposure amounts and proficiency levels. Although the results were statistically significant, there was a weak positive correlation between literal, oral, and composite proficiency measures in target language exposure in home ($r_S = .175$; $r_S = .169$; $r_S = .180$, respectively), study ($r_S = .124$; $r_S = .096$; $r_S = .115$, respectively), and life abroad settings ($r_S = .148$; $r_S = .089$; $r_S = .124$, respectively). Weak correlations imply that language proficiency does not necessarily increase as the amount of target language exposure in each of those settings increases.

The second set of research questions (see Table B2 in Appendix B) focus on heritage and native speakers who scored at advanced levels on the CBE test. The second set of research questions used a small dataset ($n = 15$) and concluded in a lack of statistically significant evidence of correlations between CLE and proficiency. For Research Question 4, the results for

the correlation between CLE and proficiency were not statistically significant. In addition, most of the correlational tests between target language quality and settings did not yield statistically significant results. The results are unexpected and incongruent with the literature discussed in chapter three. Such measures of target language quality and exposure represent language modeling by a "more capable peer" (Vygotsky, 1978, p. 86). It follows that the more contact with a more capable speaker, the higher the student's proficiency level. However, these results do not affirm this theory. The only statistically significant correlations CLE and proficiency were for literal (p = .016) and composite (p = .010) proficiencies in the combination of home, school, extracurricular, and holiday settings.

To fully understand the contextual factors of the advanced speaker in Research Question 4, the researcher viewed each individual's data. Due to the abundance of detail in the BiLEC spreadsheet, the researcher created a visual representation of each student's linguistic profile. The visual of each individual's profile (Appendix F) allows the researcher to fully understand the extralinguistic factors that describe the student's past and present context beyond the CLE numerical data.

Extralinguistic Factor Grid

The researcher used the BiLEC data to develop a visual representation of the contextual factors featured in the BiLEC spreadsheet. The researcher concluded four major areas of interest in viewing the individual's profile: 1) quality and quantity of language models at home and surrounding environment, 2) quality and quantity of language models at school, 3) current quantity and quality of language models, and 4) current quantity of language exposure in different settings of the individual.

Quadrants 1 and 2 (Appendix F) represent the initial or past exposure of target language, target culture, and the respective target language environment. As these two quadrants describe the individual's past language acquisition conditions, the information is fixed or unchangeable. The tick marks in Quadrants 1 and 2 symbolize both the data in the BiLEC, as well as the literature. For example, as asked in the BiLEC, the y-axis represents how long the student lived in the target language environment prior to the age of arrival (AOA) to the U.S. The BiLEC also asks about the target language quality of language inputs in the home. This information is represented on the x-axis in Quadrant 1, using the same scale as in the BiLEC. The x-axis in Quadrant 2 portrays the literature regarding types of language schooling (see chapter three). Quadrants 3 and 4 represent the variability of choices and factors for the LOTE speaker. The y-axis in Quadrants 3 and 4 plot the total waking hours spent in the target language. The tick marks for total waking hours were divided based on the assumption that there are 112 waking hours in one week (estimated eight hours of sleep each night). Therefore, the researcher set the average mark as 56 hours. Quadrant 4 focuses on the amount of time during a given year that the student spends in the target language in different settings. The more ideal the conditions on each axis, the further the plotted point is in each quadrant. Figure F1 in Appendix F illustrates these quadrants.

The Extralinguistic Factor Grid is an important visual element that supports the overall understanding of an individual's language background. The correlational results of Research Questions 2 and 4 led to unexpected results, in which increases in the amount of target language exposure did not necessarily correlate with higher proficiency levels. These results lead to the notion that quantities alone, whether CLE, amounts of exposure in different settings, or age cannot paint the full picture of an individual's language background. Such numbers should be

contextualized within several extralinguistic factors that holistically describe the individual's language background. The Extralinguistic Factor Grid serves as a visual representation of the larger picture. As native and heritage speakers are central constructs to this research study, the researcher separated native speakers and heritage speakers to view these representations.

Native advanced speakers. As explained above, the native speaker is a key construct in this dissertation study. The researcher used each of the BiLEC data from the native speakers in the dataset and plotted the extralinguistic factors of each on the Extralinguistic Factor Grid introduced above. The researcher observed each student's profile in relation to each other by plotting one point in each quadrant that describes the individual based on the BiLEC data. Figure G1 of Appendix G shows the points for each quadrant, which depict the contextual factors of each native speaker in the advanced speaker dataset. Each color symbolizes the responses of one individual's BiLEC spreadsheet results. The researcher can observe the trends in the native advanced speaker responses in relation to one another.

One trend is that all native advanced speakers hover in the two outer corners of Quadrants 1 and 2. Quadrant 1 represents the quality and quantity of language models at home and in the students' environment, all native speakers coalesce around the characteristics of being raised by a native speaker (quality = 5.0) at home and living in the target language environment their entire lives. In addition, all native speakers meet at the far outer corner of Quadrant 2, which represents the quality and quantity of language models in the school and surrounding environment. The plots slightly vary depending on the AOA, which may be as young as 13 years old. These trends are logical, since, in this study, native speakers by definition have an AOA $\geq$ 12 years old. Because the first and second quadrants largely represent parental decisions of who raised the individual and for what period of time, the upper two quadrants are largely

"fixed". In other words, individuals have little control over who raised them and what type of language exposure they had as infants or young children.

The two lower quadrants represent current or present language exposure and use. These two lower quadrants represent choices that individuals can make about their current exposure and use of the target language. Three out of the four native speakers average over 56 waking hours per week in the target language. There is a sharp difference between the native speaker who averages 16 hours (orange star) versus the 70 hours (green star) per week spent in the target language. Nonetheless, native speakers similarly scored at advanced levels on the proficiency exam. This may correlate with the notion that students with an AOA over 12 years are able to sustain at high levels of language without significant attrition over the few years of adolescent life, even with a minimum of a 16 hours of target language use per week. Using the number of holidays spent in the target language, the researcher plotted the points representing each native speaker in the fourth quadrant. However, the BiLEC does not yield enough information to capture time in settings, such as time spent abroad or with the target language community. For this reason, all four native speakers represented on this grid are plotted close to one another in Quadrant four. If the BiLEC asked more details about how students use language beyond the home, this quadrant may reveal differences.

Heritage advanced speakers. As explained in the section above regarding native advanced speakers, the researcher plotted the characteristics of heritage speakers on a separate grid. Using a different Extralinguistic Factor Grid, the researcher plotted the points in each quadrant to represent the BiLEC data of the heritage advanced speakers. Figure G2 of Appendix G illustrates these contextual factors. The upper two quadrants, which represent past language exposure and use, illustrate variation in the heritage speakers' history. The heritage speakers

vary greatly in the amount of time they may have lived in the target language country prior to their arrival to the U.S. However, one commonality is the native speaker models that every advanced heritage speaker had during their initial acquisition. As shown in Figure G2 of Appendix G, all advanced heritage speakers indicated a level five ("native fluency") on the BiLEC for their home language models, usually the parents. This dynamic is affirmed in the literature and in Vygotsky's (1978) zone of proximal development, whereby the more knowledgeable peer plays a strong role in learning. However, the variation occurs in how long the heritage speaker was exposed to a native speaker language environment. Since this study defines the heritage speaker as having an AOA of earlier than 12 years, half of the heritage speakers in this dataset indicate never having lived in the target language environment. Still, these individuals are still able to demonstrate advanced levels of proficiency.

Considering the two lower quadrants of the grid, the heritage speakers mirror the behaviors of native speakers in terms of the quantity of waking hours that are spent each week in the target language. As depicted in Figure G2 of Appendix G, the trend is that most heritage advanced speakers accumulate upwards of 50 waking hours of target language exposure during the week. In other words, advanced heritage speakers spent about half of their time in the target language. The pattern is noteworthy since heritage speakers who may not have had formal schooling as part of their initial language acquisition (Quadrant 2) could still reach high proficiency levels under ideal conditions.

The findings of the research questions did not yield strong correlations for CLE and proficiency nor did they result in statistically significant correlations. The researcher concludes that when considering the complex phenomena of language acquisition and maintenance, the quantity of target language exposure is not the only factor. The researcher obtained abundant

data regarding past and current language exposure using the BiLEC data. When visually represented in the Extralinguistic Factor Grid, the characteristics of an individual's language acquisition (upper two quadrants in Appendix G) the BiLEC data for native speakers were similar. The characteristics for heritage speakers varied in the AOA and time in a target language environment. All speakers shared the characteristic of being raised by a native speaker. This reinforces the idea that individuals who demonstrate advanced levels of proficiency were surrounded by more capable peers (Vygotsky, 1978). The presence of the native speaker caretakers also reinforces Krashen's Input Hypothesis (1982), which emphasizes the interaction between an expert and a novice learner.

The lower two quadrants in Appendix G represent where students have influence over how and where one supplements target language use. Although the BiLEC does not provide enough data to accurately depict the possible associations of supplemental language activities, the quadrants remain of high interest. Heritage and native speakers differ in AOA ranges and thus have varying attritional effects of TL (Aalberse & Muysken, 2019; Brecht & Ingold, 2002; Keijzer & de Bot, 2019; Lacorte & Canabal, 2003; Montrul, 2005; Polinsky, 2008; Singleton & Pfenninger, 2019; Valdés, 2014) due to varying dominance in the majority language (English). Yet both heritage and native speaker groups reach high levels of proficiency. This suggests that the lower two quadrants which represent supplemental and continued development of the TL are key areas of emphasis and worthy of attention.

Limitations

There are several limitations to this research study. The small sample size of advanced proficiency speakers limits the generalizability of the findings to the greater population. In addition, the language background questionnaire and BiLEC questions are in English. The very

nature of a sample of advanced speakers of a LOTE presumes that some individuals may be English Learners. Also, the BiLEC, in particular, asks for the recollection of one's childhood, including infancy. The responses to the childhood-oriented questions may be inaccurate, given the age and cognitive abilities of respondents at that time.

The author of the BiLEC intended the instrument to be implemented as a face-to-face protocol but acknowledges the ability to utilize the questions in written form (Unsworth, 2016). The student responses to the BiLEC used in this research study were previously collected through a Google form, which included the transcribed versions of the original BiLEC questions in survey form. Because the researcher used pre-existing questionnaire data, she could not seek clarification from the respondents for illogical answers. For example, students commonly responded with percentages of target language use divided between two or three languages that do not equal 100% (e.g., target language use was 100% and English was 25%). This discrepant pattern of percentages was typical for all questions pertaining to the percentage of language use in different settings. The researcher deduced intended percentages based on subsequent responses in the questionnaire regarding the same information.

Another common inconsistency in the BiLEC data was that no students listed English as another language that they speak. The researcher used the responses on successive questions to reconcile the discrepancy. Some students listed the current year as their birth year. The researcher used other data in the questionnaire to correct the information before inputting the data into the BiLEC spreadsheet. The accuracy of this study's findings depends on the degree to which the proficiency exam reflects the true language skills of the individual. Such accuracy is dependent upon the efforts of the individual to showcase his or her abilities on the exam.

Finally, while the combination of the language background questionnaire and BiLEC responses provide an extensive amount of data, some areas pertinent to understanding advanced proficiency levels are not captured. One such area of interest is the notion of language education. Although the BiLEC asks about the school environment, it does not ask participants to specify the type of school to which the individual refers when answering the question. As delineated in chapter three of this study, various types of language education play a role in initial acquisition and continued language education. These types include formal schooling such as immersion or traditional language courses (Pufahl & Rhodes, 2011) or heritage schools (Brecht & Ingold, 2002). The researcher demarcates these variances of formal schooling and heritage community schools in the Extralinguistic Factor Grid to understand the individual's language background fully.

Furthermore, the instruments used in this study are not designed to measure cultural competence, which characterizes speakers of the highest proficiency levels (ACTFL, 2012b). For example, speakers of the "Superior" level, which is the next major level after "Advanced" on the ACTFL proficiency scale, commands the complexities of the target language due to the "linguistic experience within the target culture" (ACTFL, 2012b, p. 16). After the "Superior" level, speakers of the "Distinguished" level of proficiency "tailor language to a variety of audiences by adapting their speech and register in ways that are culturally authentic (ACTFL, 2012a, p. 9). "Distinguished" speakers are also able to integrate cultural references to enhance their expressions, which enable them to speak succinctly yet communicate ideas clearly (ACTFL 2012a). This is indicative that cultural competence is an essential component of the most skilled speakers.

Recommendations

Given this study's results and limitations, the researcher recommends extending this study to employ face-to-face interviews in the students' preferred languages. An interview in the preferred language would reduce inconsistencies in students' responses, since the researcher can clarify confusing answers and ensure understanding of the questions (Creswell, 2012). In addition, recruiting additional participants to create a larger sample size may yield statistically significant results.

The BiLEC asks about the number of hours the individual spends reading, using technology, holidays, and engaging in extracurriculars in the target language (Unsworth, 2016). However, the instrument does not inquire about other supplemental ways in which an individual maintains and develops language. Chapter three of this study cites literature regarding common ways individuals maintain and progress in their language skills. These ways include heritage or community schooling (Brecht & Ingold, 2002), language education programming (Pufahl & Rhodes, 2011), and travel abroad to target language countries (Jochum, 2014). Also, social relationships, especially those that are single-language exchanges, increase the target language significance and purpose (Dongyu et al., 2013; Mitchell et al., 2013; Unsworth, 2016) with a more capable peer (Vygotsky, 1978).

Finally, while the scope of this study examines contextual factors of speaking a LOTE, cultural competency is a critical component of language skills (ACTFL, 2012b). The National Standards of Learning Languages (1996, 2006) reiterates that the skill to embed and exhibit profound cultural understanding is "the powerful key to successful communication: *knowing how, when, and why, to say what to whom"* (National Standards in Foreign Language Education Project, 2006, p. 11). Those at high levels of competency connect with others in the target

language at the point when the mechanics of being a bilingual speaker are insufficient to communicate. Reaching the highest levels of proficiency is the highly sought fruit of knowing both the mechanics of a language, as well as the artistic skill of exhibiting cultural competence to communicate effectively. The findings of this research study reveal that heritage and native speaker groups share the commonality of native speaker caretakers who immersed them in language and culture. In this regard, heritage and native speakers are well-positioned to reach the highest levels of a LOTE (Montrul, 2012).

The implications of this research study for schools, districts, and communities are profound. On one hand, the act of awarding language credit through an examination validates student language acquisition in the home or by way of the target language environment, outside of the formal classroom (Pressey, 1945). CBEs award credit without formally completing language courses (Texas Education Agency, 2014c). It follows that native, heritage, and other students who earn enough credits would not enroll in formal courses. Upper-level course enrollment in the researcher's school district dwindles after the first two levels. Chapter two discusses the loss of 96% of student enrollment between levels two and three. If native and heritage speakers do not leverage formal language courses in schools as an opportunity to maintain and grow to advanced language proficiency levels, do they engage in other types of maintenance? This question would be answered through the further inquiry of the lower two quadrants of the Extralinguistic Factor Grid in Appendix F. School districts must inform their communities of the importance of continuing language studies or maintaining their language skills through other opportunities. In this sense, heritage schools in the community play a crucial role in the endeavor to structure settings in which students of the same heritage may come together and build collective cultural and linguistic identity.

Conclusion

Heritage and native speakers of a LOTE are national assets (Brecht & Ingold, 2002) whose cultural and linguistic identities characterize our nation. It is of the utmost importance that individuals and their communities invest in the opportunities for relevant language experiences that nurture the value for and grow LOTE skills. The complexity of language acquisition and maintenance prompts individuals to reflect upon the contextual factors within one's control. As explained in the previous section, the findings of this research illustrate how both heritage and native speakers maintain language skills after initial target language acquisition from childhood.

This research study examined the key contextual factors associated with LOTE proficiency. In particular, the Bilingual Language Experience Calculator (BiLEC) delved into past and present contextual circumstances that characterize the language acquisition backgrounds of heritage and native speakers. As described earlier in this chapter, this correlational study yielded unexpected results. The first set of research questions, which used a large dataset (n = 994), resulted in weak positive relations between amount of TL exposure and proficiency levels. The second set of research questions used a small dataset (n = 15) and concluded in a lack of statistically significant evidence of correlations between CLE and proficiency. In either case, the subjectiveness of self-reported language background data on a questionnaire could be clarified through face-to-face interviews. Regardless of the inconclusiveness of the findings, this research study affirmed the notion that linguistic factors should be wholly contextualized to appreciate the broader strokes of an individual's canvas.

The Extralinguistic Factor Grid provides a holistic representation of the factors associated with advanced proficiency. The grid does not entirely epitomize the varying characteristics of

every individual situation. However, a visual overview facilitates reflection and intentional life choices that foster advantageous language maintenance and learning opportunities. This is particularly true for Quadrants 3 and 4 in Appendix F, which focus on the details of supplemental language experiences to grow language skills. A noteworthy conclusion is that while heritage and native speakers' language history may optimize linguistic skills, the past does not destine an individual's language abilities for permanent success or failure.

The potential for advanced language proficiency is only as high as the opportunities and effort of those who play significant roles in such endeavors. This includes families, schools, communities, and other professional stakeholders who recognize, exhibit, and support the work of language education. Such an undertaking is not easy in an English-dominant environment. Advocacy for language education is a national necessity. It is an investment that honors our nation's cultural identities and protects our "reservoir of linguistic competence" (Brecht & Ingold, 2002, p. 2).

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Appendix A

Critical Needs Languages

Table A1

Critical Needs Languages

2012	2020
Arabic	Arabic
Azerbaijani	Azerbaijani
Bangla	Bangla
Chinese	Chinese
Hindi	Hindi
Indonesian	Indonesian
Japanese	Japanese
Korean	Korean
Persian	Persian
Punjabi	Portuguese
Russian	Punjabi
Turkish	Russian
Urdu	Swahili
	Turkish
	Urdu

Note: List of 2012 scholarship programs for critical languages through the U.S. State Department. From U.S. State Department programs (https://www.govtilr.org/Publications/ILRDOS2012.pdf).

List of 2020 scholarship programs for critical languages through the U.S. State Department. From Critical languages scholarship programs (https://clscholarship.org/languages)

Appendix B

Instrumentation

Table B1

Research Design and Data Analysis

RQ Set	Research Question	Data	Instrument	Variable	Measure
First Set	1. What is the average amount of target language exposure within different contexts (home, school, or abroad) of students who are speakers of a LOTE? **Descriptive**	All CBE test takers regardless of proficiency score	STAMP 4S language background questionnaire (approximately 355 tests)	Avg amount of target language exposure within different contexts (home, school, abroad)	- frequency with which students speak the TL at **home** (Never; Every day; 1-2 times a week; 1-3 times a month; Every few months; 1-2 times a year; Less than once a year.) - length of time studied the TL at **school** (number of years) - length of time lived in TL country **abroad** (number of months and years)
	2. What is the correlation between target language exposure and proficiency levels of students who speak a LOTE? **Correlational-Spearman due to ordinal variable**	All CBE test takers regardless of proficiency score	STAMP 4S language background questionnaire (approximately 355 tests)	Target language exposure	- frequency with which students speak the TL at **home** (Never; Every day; 1-2 times a week; 1-3 times a month; Every few months; 1-2 times a year; Less than once a year.) - length of time studied the TL at

	(proficiency scale)				**school** (number of years) - length of time lived in TL country **abroad** (number of months and years)
				Proficiency skills (oral, literal, and composite)	**Oral**- sum of listening + speaking scores **Literal**- sum of reading and writing scores **Composite**- sum or oral and literal scores Score is an ordinal number 1-9 that corresponds to proficiency level (ex: Novice Low= 1; Advanced High=9)
Second Set	3. What is the cumulative (past and current) amount and average quality of language exposure of H and N speakers who have advanced language proficiency skills in LOTE? **Descriptive**	All heritage and native speaker CBE test takers who scored at advanced levels (score of 6 of above on listening, speaking, reading and/or writing portion)	BiLEC (15 responses available)	Cumulative amount of language exposure	Number of years (continuous, ratio) which represents the accumulated time over a child's lifetime of target language exposure in home, academic, and social settings
				Average quality of language exposure	Average quality of TL exposure on a scale of 0-5. (ex: 0=no ability; 5= native)

	4. What is the relationship between the cumulative amount (past and current) of target language exposure and advanced proficiency levels of H and N speakers of LOTE? **Correlational- Spearman due to ordinal variable (proficiency scale)**	All heritage and native speaker CBE test takers who scored at advanced levels (score of 6 of above on listening, speaking, reading and/or writing portion)	BiLEC (15 responses available)	Cumulative amount of language exposure	Total proportion of year with exposure to target language (taking child's age at testing into account) including all settings in lifetime. Shown as number of years (continuous, ratio)
				Average quality of language exposure	Average quality of TL exposure on a scale of 0-5. (ex: 0=no ability; 5= native)
				Proficiency skills (oral, literal, and composite)	**Oral**- sum of listening + speaking scores **Literal**- sum of reading and writing scores **Composite**- sum or oral and literal scores Score is an ordinal number 1-9 that corresponds to proficiency level (ex: Novice Low= 1; Advanced High=9)

Table B2

Items in Language Background Questionnaire on Spanish STAMP 4S Test

Question	Response Type
What language did you learn as a child and speak with your family?	Drop-down menu
Do any of your parents or grandparents speak Spanish?	Yes/ No
How often do you speak Spanish at home?	Multiple Choice: Never; Every day; 1-2 times a week; 1-3 times a month; Every few months; 1-2 times a year; Less than once a year.
How many years have you studied or spoken Spanish?	Drop-down menu
Have you studied or lived in a country where Spanish is the national or primary language?	Yes/ No
How long were you there?	Open response: Months; Years

Appendix C

Topics Measured in Bilingual Language Experience Calculator

Table C1

Topics Measured in Bilingual Language Experience Calculator (BiLEC)

Topic	Measurement
Current input of target language	percentage
Current output of target language	percentage
Cumulative input of target language over lifetime	number of months
Cumulative output of target language over lifetime	number of months

Appendix D

Proficiency Scales in BiLEC

Table D1

Speaking Proficiency Scale Used in Bilingual Language Experience Calculator (BiLEC)

Speaking	Numerical Value
Hardly any fluency	0
Limited fluency	1
Fairly fluent	2
Quite fluent	3
Very fluent	4
Native fluency	5

Table D2

Understanding Proficiency Scale Used in Bilingual Language Experience Calculator (BiLEC)

Speaking	Numerical Value
Virtually no understanding	0
Limited understanding	1
Some understanding	2
Good understanding	3
Excellent understanding	4
Native understanding	5

Table D3

Amount of Exposure Scale Used in Bilingual Language Experience Calculator (BiLEC)

Target Language (TL) Exposure	Numerical Value
Hardly ever TL, almost always other language(s) (OL)	0.00
Seldom TL, usually OL(s)	0.25
50% TL, 50% OL(s)	0.50
Usually TL, seldom OL(s)	0.75
Almost always TL, hardly ever OL(s)	1.00

Appendix E

Lengths of Language Exposure of Advanced Speakers

Table E1

Cumulative and Traditional Lengths of Language Exposure of Advanced Speakers

Student	Cumulative Length of Exposure	Traditional Length of Exposure	Difference
1	14.85	17.09	2.2
2	7.79	15.53	7.7
3	14.41	16.41	2.0
4	11.63	15.93	4.3
5	15.07	16.63	1.6
6	10.45	15.25	4.8
7	10.94	16.44	5.5
8	13.76	17.5	3.7

Appendix F

Extralinguistic Factor Grid for Observation of Past Language Background and Current Maintenance

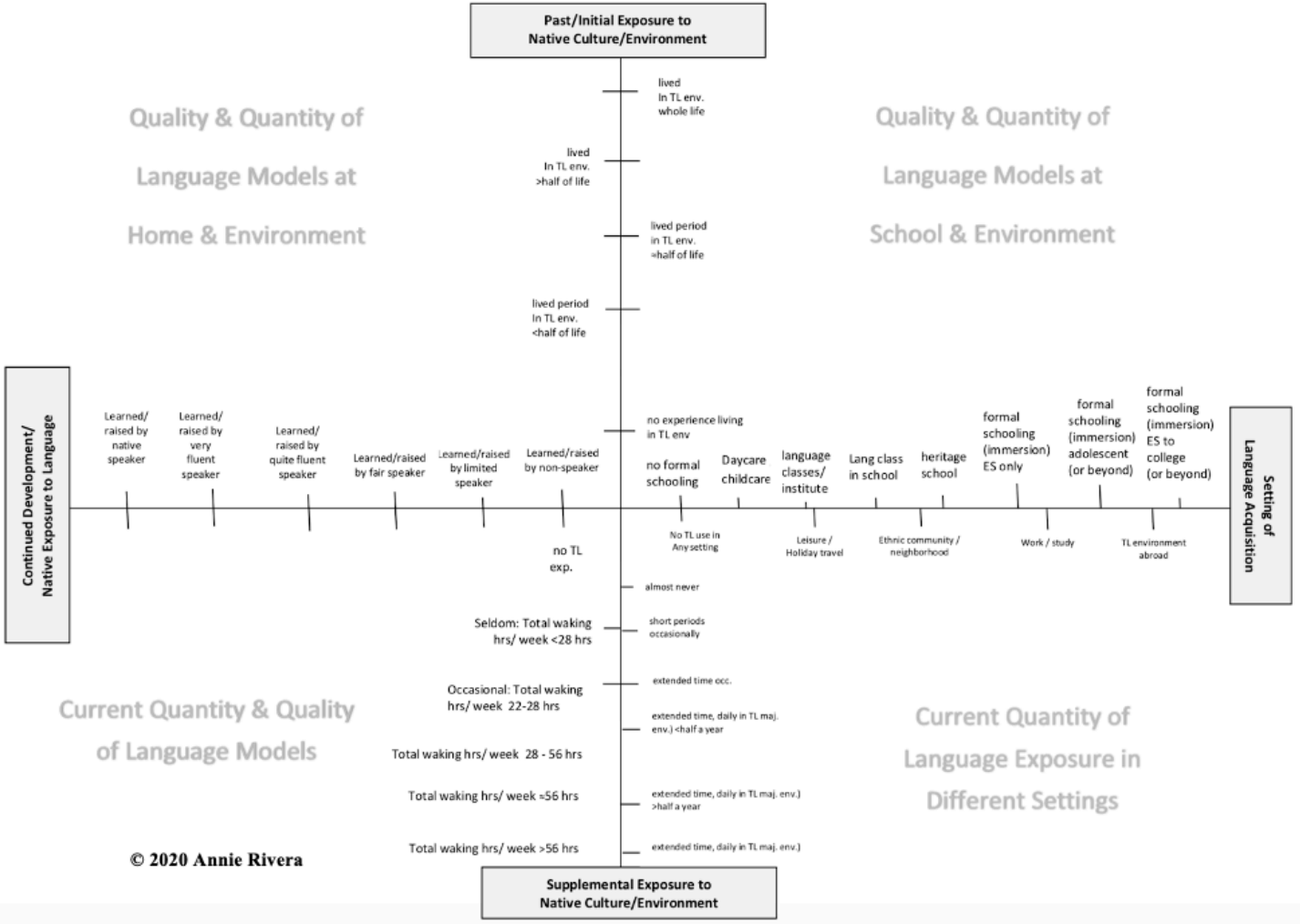

Figure F1. Extralinguistic Factor Grid

Appendix G

Extralinguistic Factor Grid for Native and Heritage Speaker Samples

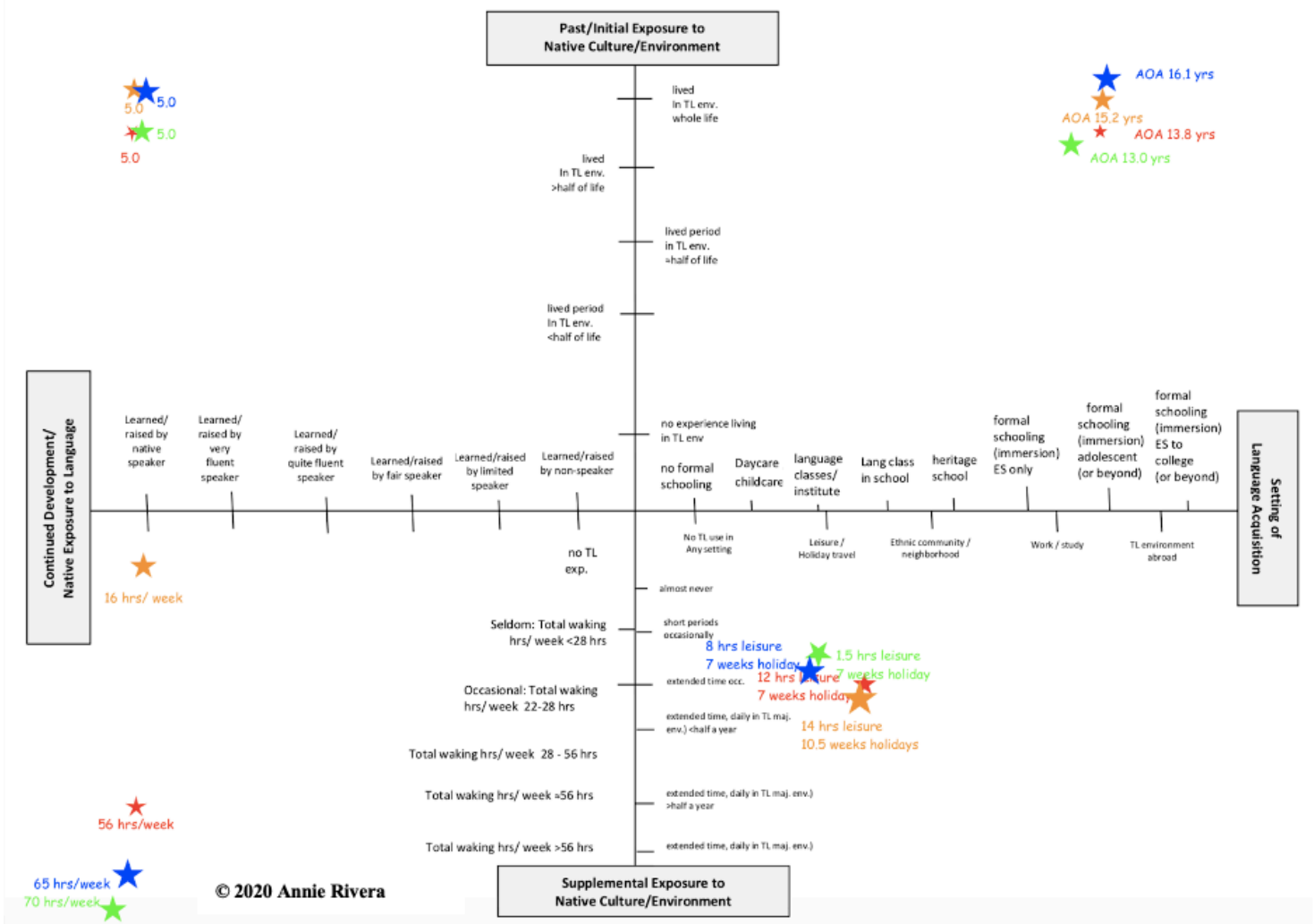

Figure G1. Extralinguistic Factor Grid for Native Speaker Sample

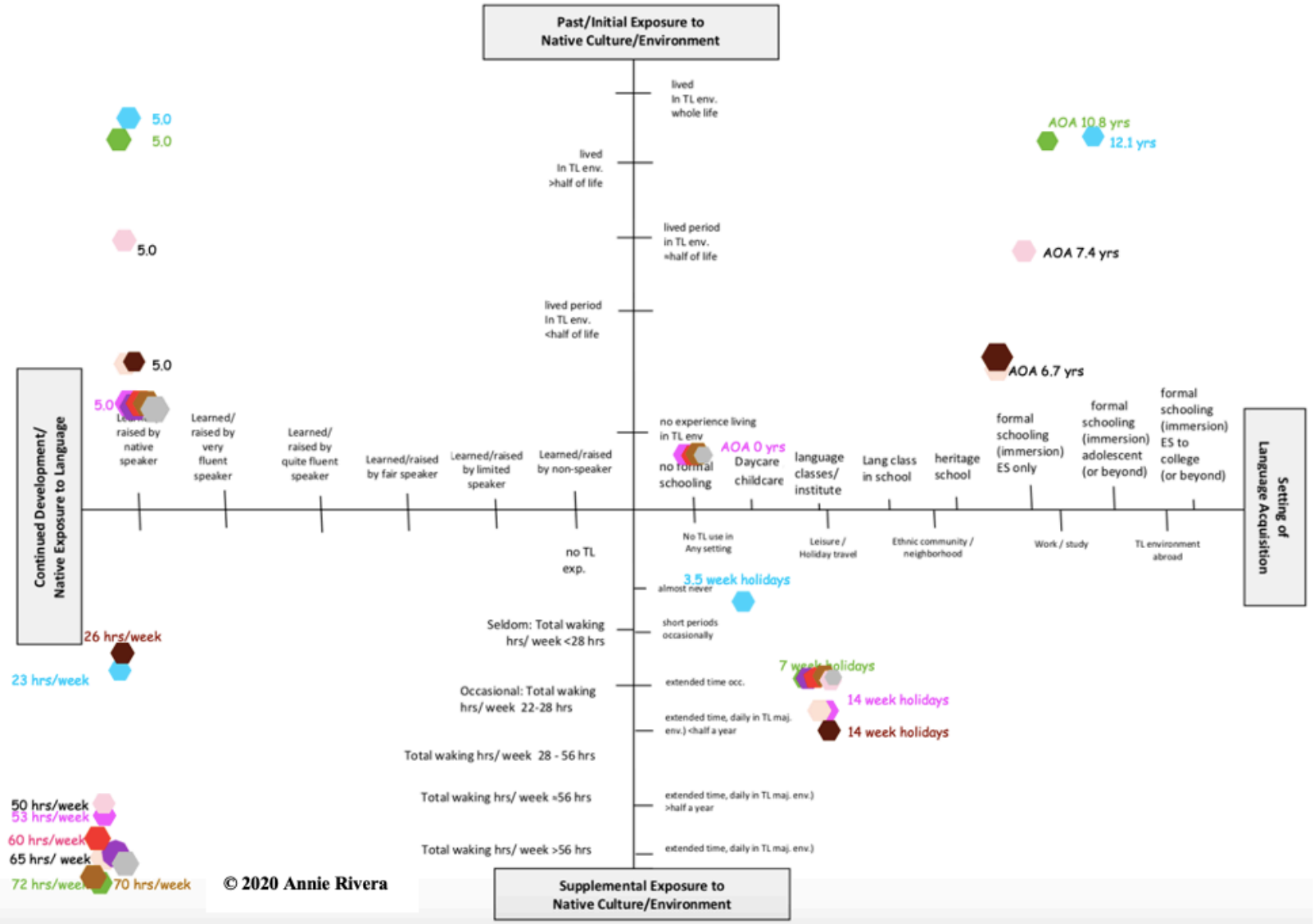

Figure G2. Extralinguistic Factor Grid for Heritage Speaker Sample

Biographical Information

Annie Rivera is currently the supervisor of secondary world language programs and the elementary Spanish Immersion Program in Lewisville Independent School District in Texas. Rivera's professional background includes foreign language, dual language immersion, and English as a Second Language instruction at elementary and secondary levels in Texas and abroad. Prior to her current role, she was an instructional specialist and coordinator for language programs. Rivera is a Team Leader for NSA-sponsored STARTALK programs and serves on the advisory council for the Council on International Educational Exchange. She currently serves the Texas Association for Language Supervision as President of the Board. Rivera is the co-author of *Identifying and Serving Culturally and Linguistically Diverse Gifted Students* (Prufrock Press, 2012). She has also contributed articles to *The Language Educator* (American Council on the Teaching of Foreign Languages). Most recently, Rivera was awarded the Supervisor of the Year (2020) by the National Association of District Supervisors of Foreign Languages.

Rivera completed her undergraduate studies at University of Pennsylvania and her doctoral requirements in the School of Education at Johns Hopkins University. Passionate about heritage language maintenance, Rivera believes that her greatest life accomplishment thus far is raising her young daughter to reflect linguistically and culturally, her Korean and Peruvian ancestry.